THE LANCET

A Journal of British and Foreign Medicine, Surgery, Obstetrics, Physiology, Chemistry, Pharmacology, Public Health, and News.

TELEGRAPHIC ADDRESS—LANCET WESTRAND LONDON TELEPHONE NUMBER—GERRARD 5358

No. VIII. OF VOL. II., 1919.
No. 5008. Vol. CXCVII. LONDON, SATURDAY, AUGUST 23, 1919. Pp. 96—Price 10d.

A NEW TREATMENT FOR GONORRHŒA.
By CHARLES RUSS, M.B.Lond., M.R.C.S.,
Physician-in-Charge Electro-therapeutic Department, Male Lock Hospital, London.

"This system of treatment merits further attention, as it is both scientific and ingenious."—BRITISH MEDICAL JOURNAL.
"We welcome this small work as pointing to a distinct advance in our efforts to master a disease so often belittled but which may have most dire results."—MEDICAL PRESS AND CIRCULAR.
London: H. K. Lewis & Co. Ltd., 136 Gower-street, W.C. 1.

Second Edition, entirely Reset and Revised. 54 Illustrations. 15s. net.
MENTAL DISEASES.
A TEXT-BOOK OF PSYCHIATRY FOR MEDICAL STUDENTS AND PRACTITIONERS.
By R. H. COLE, M.D., F.R.C.P.
BRITISH MEDICAL JOURNAL:—"The details of general treatment and management of patients suffering from various forms of insanity are complete and practical. ..... Excellently illustrated."
University of London Press, Ltd., 18, Warwick-square, London, E.C.

Demy 8vo. 412 pages, 12 Plates, and 122 Illus. Cloth. Price 10s. 6d. net.
EYE, NOSE, THROAT, AND EAR.
A Manual for Students and Practitioners.
By JAMES FORREST, M.B., Ch.B.Edin.
Henry Kimpton, Medical Publisher, 263, High Holborn, London, W.C.

OXFORD MEDICAL PUBLICATIONS.

JUST PUBLISHED.

WAR NEUROSES AND SHELL SHOCK.
By SIR FREDERICK W. MOTT, K.B.E., R.A.M.C., F.R.S.,
Brevet Lt.-Colonel, Senior Consulting Neurologist to the Maudsley Neurological Clearing Hospital, Denmark Hill, S.E.
Demy 8vo. 364 pp. Cloth. Illustrated in Black and White, with 3 Colour Plates. 16s. net.

PSYCHOSES OF THE WAR,
INCLUDING NEURASTHENIA AND SHELL SHOCK.
By H. C. MARR, Lt.-Col. R.A.M.C.(T.), M.D., F.R.F.P.S.,
Neurological Consultant to the Scottish Command; H.M. Commissioner of Control for Scotland, &c.
Demy 8vo. Cloth. 336 pp. With 60 Illustrations. 16s. net.

Henry Frowde and Hodder & Stoughton, 17, Warwick-square, Newgate-street, London, E.C. 4.

Second Edition. 8 Plates and 36 Figs. Price 7s. 6d.
BELLAMY GARDNER'S SURGICAL ANÆSTHESIA.
"Its pages focus much valuable information."—BRIT. MED. JOUR.
London: Baillière, Tindall & Cox, 8, Henrietta-st., Covent Garden, W.C.2.

Quarto, Cloth. 7 Coloured Plates and 75 Illustrations. 21s. net.
(Postage 6d. extra.)
THE BIOLOGY OF THE BLOOD CELLS.
WITH A GLOSSARY OF HÆMATOLOGICAL TERMS.
By O. C. GRUNER, M.D. Lond.
"Has no rival in the English language. Indeed, we doubt whether a similar volume exists in any language."—BRITISH MEDICAL JOURNAL.
Bristol: John Wright & Sons Ltd. London: Simpkin & Co. Ltd.

Now Ready. Price, Cloth, 2s. 6d. net (postage 3d.).
OTITIS MEDIA
(MASTOID DISEASE).
SAVING THE HEARING OF THE DISCHARGING EAR WITH PERFORATED DRUMHEAD.
By CHARLES J. HEATH, F.R.C.S. Eng.,
Consulting Aurist, Metropolitan Asylums Board; late Surgeon, Throat Hospital, Golden-square, London.
"In his book Mr. Heath gives us a new pathology in Otitis Media. ..... His work is already widely known, and this publication of his will carry conviction that the old pathology and the antiquated methods of treatment are finished, and that a new era has dawned in aural surgery. ..... It is a work which every medical man should read and possess, and which all education authorities should consult."—MEDICAL WORLD.
Baillière, Tindall & Cox, 8, Henrietta-st., Covent Garden, London, W.C.2.

THIRD EDITION NOW READY. Price 4s. 6d. net.
INTENSIVE TREATMENT OF SYPHILIS
AND LOCOMOTOR ATAXIA BY AACHEN METHODS.
By REGINALD HAYES, M.R.C.S.
THE LANCET says:—"No better exposition of the method as practised at Aachen can be found than that contained in this little work."
London: Baillière, Tindall & Cox, 8, Henrietta-street, Covent Garden.

Now Ready. Pp. xi.+289. With 3 Charts. 5s. net.
ON ALCOHOLISM: Its Clinical Aspects and Treatment.
By FRANCIS HARE, M.D., Medical Superintendent of the NORWOOD SANATORIUM, Beckenham.
"Marked by candour, common sense, and moderation ..... likely to become the standard text-book."—BRITISH MEDICAL JOURNAL.
London: J. & A. Churchill, 7, Great Marlborough-street.

Second Edition, Enlarged. Crown 8vo. 7s. 6d. net.
With 31 original Photographs and 150 special Prescriptions.
TREATMENT OF DISEASES OF THE SKIN.
By KNOWSLEY SIBLEY, M.D. Camb.
London: Edward Arnold, 41 and 43, Maddox-street, W. 1.

BY
SIR PETER FREYER, K.C.B.
ENLARGEMENT OF THE PROSTATE.
With a Description of the Author's Operation of Total Enucleation of the Organ. A Work based on 1500 Cases of the Operation.
(FOURTH EDITION in preparation.)
SURGICAL DISEASES OF THE URINARY ORGANS.
(SECOND EDITION in preparation.)
Baillière, Tindall & Cox, 8, Henrietta-street, Covent Garden, London.

SECOND EDITION. In 2 vols. 45s. net.
DEFORMITIES, including DISEASES of the BONES and JOINTS. A Text-book of Orthopædic Surgery. Illustrated by 70 Plates and over 1000 Figures, and by Notes of Cases.
By A. H. TUBBY, C.B., C.M.G., M.S.
Second Edition: "The standard text-book in English on the subject."—THE LANCET.
First Edition: "Standard work on the subject in the English language."—BRITISH MEDICAL JOURNAL.
Macmillan & Co., Ltd., St. Martin-street, London, W.C.

JUST OUT.
EWING'S NEOPLASTIC DISEASES

Dr. Ewing discusses tumors as specific clinical entities. His aim is to bring all the weight of experimental research and clinical experience to bear upon the prevention, diagnosis, and treatment of neoplastic diseases. To show you how to recognise cancer in its incipiency, to distinguish between benign and malignant growths, to determine upon the prognosis and course of treatment—these practical, clinical points are the features upon which he has concentrated his efforts.

Octavo of 1027 pages, with 479 illustrations. By JAMES EWING, Sc.D., M.D., Professor of Pathology at Cornell University Medical School. Cloth, 42s. net

W. B. SAUNDERS COMPANY, Ltd., 9, Henrietta St., LONDON, W.C.2.

LESLIES' ZŌPLA

(ZINC OXIDE PLASTER) Formerly Zincoplast.

THE PERFECTED SURGICAL PLASTER.

Instantly Self-adhesive. Will not slip wherever put. THE ONE REAL NON-IRRITATING PLASTER. Will keep without drying up.

Supplied on White and Flesh-colour Cloths, also on Holland on Spools ½" to 4" wide in 5 or 10 yard lengths in rolls 7" and 12" wide. Also on moleskin, chamois leather, felt, and waterproof cloth. **SAMPLES ON REQUEST.**

ZŌPLA is made by the firm with the reputation for BROWN HOLLAND STRAPPING (Original make).

LESLIES, Ltd. (British firm throughout), **62, London Wall, E.C. 2.**

THE BRITISH OXYGEN COMPANY, LTD.

OXYGEN

IN CYLINDERS OF ANY SIZE FOR MEDICAL AND OTHER PURPOSES.

LONDON: Elverton Street, Westminster, S.W.	Teleph. 4706, 4707, 6717, & 6718 Victoria (4 lines).	Tel. Ad.: "Brin's Oxygen," "Sowest" London.
" Tunnel Avenue, East Greenwich.	Teleph. No. 674 Greenwich.	
" North Wembley, Middlesex.	Teleph. 209 Wembley.	
BIRMINGHAM: Saltley Works.	Teleph. 87 East Birmingham.	Tel. Ad.: "Baryta," Birmingham.
COVENTRY: Terry Road.	Teleph. 836 Coventry.	Tel. Ad.: "Oxygen," Coventry.
WOLVERHAMPTON: Lower Walsall Street.	Teleph. 801 (2 lines), W'hton.	Tel. Ad.: "Oxygen," W'hampton.
MANCHESTER: Great Marlborough Street.	Teleph. 2538 Manchester.	Tel. Ad.: "Oxygen," Manchester.
BIRKENHEAD: Bromborough Port.	Teleph. 138 Bromborough.	Tel. Ad.: "Oxygen" Bromborough.
NEWCASTLE-ON-TYNE: Shields Road, Walker Gate.	Teleph. 3239 Central.	Tel. Ad.: "Oxygen," Newcastle.
GLASGOW: Rosehill Works, Polmadie.	Teleph. No. 840, 841, & 842 Queen's Park.	Tel. Ad.: "Oxygen," Glasgow.
CARDIFF: East Moors.	Teleph. 786 Cardiff.	Tel. Ad.: "Oxygen," Cardiff.
SHEFFIELD: Celtic Works, Saville Street.	Teleph. 2801 Central.	Tel. Ad.: "Oxygen," Sheffield.

And SYDNEY, N.S.W.

"THE HOUSE FOR EVERYTHING ELECTRO-MEDICAL."

The Grevillite Therapeutic Incandescent Lamp

(PHOTOTHERAPY). PRICE COMPLETE - £15.

Owing to prevailing conditions our prices are subject to fluctuation.

The following is an extract from the "Archives of the Rontgen Ray," October, 1911:—

The physiological effects of this form of photo-therapy may be summarised thus:

1. Dilation of superficial vessels and glands.
2. Removal of venous stasis and promotion of normal circulation.
3. A bactericidal action on superficial germs.

And as a practical result of these principles we get—

1. Relief of pain.
2. Restoration of functional activity both in the skin and in the deeper glands.

It will be easily seen how broad a field there is for the clinical application of the high-candle-power lamp, and how many indications there are for its use.

In the treatment of some **skin diseases**, notably **acne, eczema, psoriasis, tinea, sycosis, syphilitic** and **other ulcers**, I have found this **succeed** where other treatment has only yielded disappointing results.

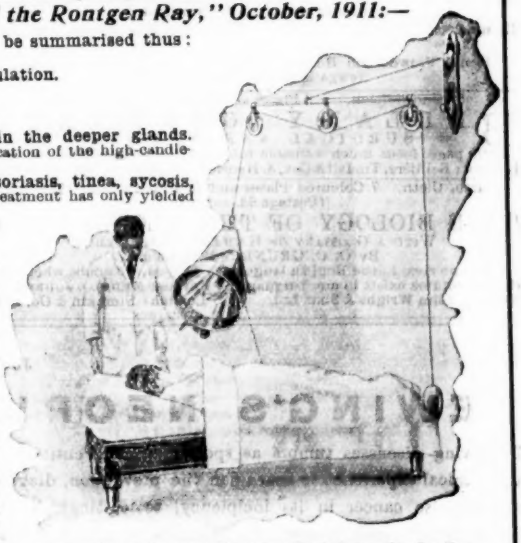
In the relief of pain I think this form of treatment stands pre-eminent in the armament of the modern electro-therapeutist. I venture to assert that where after a scientifically applied exposure to this light no relief is obtained, it may be taken that the case should be promptly referred to the surgeon. And there are some cases where the light will cause the pain to become more acute; this differentiates those cases of retained, walled-in pus which have gone beyond the power of phago-cytes and opsonins, and which call for immediate operative interference.

The cases of pain which are more particularly benefited are **rheumatic** and **rheumatoid** disease, **sciatica** and other forms of **neuritis, lum-bago** and the varying conditions which are classed under that generic term, and certain **functional diseases of the digestive system, especially gastric irritability** and pain.

In certain classes of **neurasthenia and insomnia**, the light passed up and down the spine for ten or twelve minutes, and then applied for a similar period to the abdomen, will produce a marked relief, and eventually **a cessation of all symptoms.**

In addition to its power of curing **obstinate acne**, the light will in many cases abort a **bubo** or **carbuncle** before the pus has formed in any great quantity. In those cases it is a great aid as a diagnostic agent, for if the pain be relieved within ten or twenty minutes it is certain that **repeated applications will effect a cure**; whereas if the pain becomes worse—and this will occur in the first few minutes—it is certain that nothing but the surgeon's knife will relieve the condition.

NOTE.—For further particulars see separate pamphlet.



A really Universal Light and Heat Apparatus for the treatment of any part of the body.

CATALOGUES SENT ON REQUEST.

Manufactured by The MEDICAL SUPPLY ASSOCIATION, Ltd.,

ELECTRO-MEDICAL INSTRUMENT MAKERS.

SHOWROOMS AND WORKS:—**167-185, GRAY'S INN ROAD, LONDON, W.C.**

THE LANCET.

No. 5008. LONDON, SATURDAY, AUGUST 23, 1919. Vol. CXCVII.

CONTENTS.

The whole of the literary matter in THE LANCET is copyright.

METHODS OF TREATMENT of Fractures of the Femur. By JAMES DRIBERG, M.C., F. R. C. S., late Captain, Royal Army Medical Corps; Surgical Registrar, London Hospital 311

ORIGINAL ARTICLES.

Perverted "Functional" Activity in the Production of Jaw Deformities. By D. M. SHAW, Curator of the Prosthetic Laboratories, Royal Dental Hospital of London.—(*Illustrated*)..... 316

I.—The Antiscorbutic and Growth-promoting Value of Canned Vegetables. By MABEL E. D. CAMPBELL and HARRIETTE CHICK. II.—The Antiscorbutic Value of some Indian Dried Fruits: (*a*) Tamarind, (*b*) Cocum, and (*c*) Mango ("Amchur"). By HARRIETTE CHICK, E. MARGARET HUME, and RUTH F. SKELTON. III.—A Comparison between the Antiscorbutic Properties of Fresh, Heated, and Dried Cow's Milk. By ROSAMUND E. BARNES and E. MARGARET HUME. (From the Lister Institute, Department of Experimental Pathology) 320

A Note on Immunised Skin-Grafts. By ARTHUR L. YATES, M.C., M.D. Lond., F.R.C.S. Edin. 324

Mucus Deposit of Urine. By S. G. BILLINGTON, M.B., B.S. Lond., late Captain, Royal Army Medical Corps; Bacteriologist, Wolverhampton General Hospital.—(*Illustrated*)..... 325

Five Cases of Spontaneous Fracture Occurring in Serving Soldiers. By C. NOON, F.R.C.S., Temporary Major, Royal Army Medical Corps; Officer in Charge of the Surgical Division of the Norfolk War Hospital..... 326

CLINICAL NOTES:
MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

The Effects of Exposure upon the Terminals of Hands and Feet. By F. JEEVES, L.R.C.P. & S. Edin., L.R.F.P.S.Glasg., Captain, R.A.M.C.(T.); Medical Officer, H.M. Hospital Ship ——; and E. R. HUNT, M.D.Cantab., M.R.C.P.Lond., Lieutenant-Colonel, R.A.M.C. (T.C.); Consulting Physician to the North Russian Expeditionary Force.—(*Illustrated*) 323

A Case of Keratodermia Blennorrhagica. By S. C. DYKE, M.B., B.Ch. Oxon., D.P.H.Oxon., Assistant Bacteriologist, College of Medicine, Newcastle upon-Tyne.—(*Illustrated*)..... 323

Cryptopodia: an Undescribed Disease. By B. C. BOUSFIELD, L.R.C.P. Lond., M.R.C.S., D.P.H. Camb. & Lond., Director, Camberwell Research Laboratories; Bacteriologist, Camberwell and Hackney.—(*Illustrated*)..... 329

REVIEWS AND NOTICES OF BOOKS.

Mortality Statistics of Insured Wage-earners and their Families in the United States and Canada. By Louis I. Dublin, Ph.D..... 330

Aids to Ophthalmology. By N. Bishop Harman, M.A., M.B. Cantab., F.R.C.S. Eng. Sixth edition..... 331

Constipation and Allied Intestinal Disorders. By Arthur F. Hurst, M.A., M.D. Oxon., F.R.C.P. Second edition..... 331

Heredity. By J. Arthur Thomson, M.A., LL.D. Third edition..... 331

Manual of Anatomy, Systematic and Practical, including Embryology. Originally written by the late A. M. Buchanan, M.A., M.D., C.M., F.R.F.P.S. Glasg. Fourth edition..... 331

Studies on Acari. No. 1, the Genus Demodex, Owen. By Stanley Hirst..... 331

FRENCH SUPPLEMENT TO THE LANCET.

Under the Editorial Direction of Professor CHARLES ACHARD, Professor of Pathology and Therapeutics in the University of Paris; and Dr. CHARLES FLANDIN, D.S.O., Chef de Clinique à la Faculté de Paris.

Radiological Examination of Pseudarthroses before and after Operations of Bony Grafts. By PAUL AUBOURG, Professor Agrégé. Cuneo's Laboratory for Radiology. (Centre for Surgery of Bones, Hospital 75, Cannes.)—(*Illustrated*)..... 332

LEADING ARTICLES.

SMALL-POX ON THE CONTINENT 337

FOOD PRESERVATION IN RELATION TO ACCESSORY FACTORS 338

UNQUALIFIED TREATMENT OF VENEREAL DISEASE..... 339

ANNOTATIONS.

"The Osler Medical Library".. 340

Alcohol in a New Rôle..... 340

A Reminiscence of William Hunter..... 341

Dental Treatment and National Health..... 341

The Metropolitan Hospital Sunday Fund..... 341

"The Dangers of the New Public Health Act"..... 342

Common Lands and Medical Usage..... 342

The Raising of the Income for Compulsory Insurance..... 342

SPECIAL ARTICLES.

Registrar-General's Decennial Supplement (1901-1910).—II.. 343

Tuberculosis in Italy..... 344

Urban Vital Statistics: Vital Statistics of London during July, 1919..... 345

THE SERVICES.

Royal Naval Medical Service.... 346

Army Medical Service..... 346

Royal Army Medical Corps..... 346

Royal Air Force..... 346

Indian Medical Service..... 346

Health of Troops on Afghan frontier..... 347

MEDICAL NEWS.

Literary Intelligence..... 330

St. Thomas's Hospital, London 342

Royal College of Physicians of Edinburgh..... 347

Royal College of Physicians of Ireland and Royal College of Surgeons in Ireland: Pass-list 347

Royal College of Surgeons in Ireland: Pass-list..... 347

Eastbourne and Child Welfare Medical Sickness, Annuity, and Life Assurance Friendly Society..... 347

Royal Medical Benevolent Fund 347

CORRESPONDENCE.

The Need for Accessory Food Factors in Infant Feeding (Mr. R. A. Barton)..... 348

The Incidence of Tuberculosis amongst Asylum Patients (Dr. Frank R. Tylecote, Dr. H. K. Abbott)..... 348

The Results of Complete Colectomy (Mr. J. B. Adams) 349

A Criticism of the Memorandum on Malaria (Mr. C. R. Corfield, Dr. Gordon Ward).. 349

The Conduct of Labour and Puerperal Sepsis (Dr. R. L. Kitching)..... 350

OBITUARY.

William Smith Greenfield, M.D. Lond., F.R.C.P.Lond. & Edin. 351

Lovell Drage, M.D.Oxon..... 351

W. Lauzun Brown, L.R.C.S. Edin., L.R.C.P.Glasg..... 330

PARLIAMENTARY INTELLIGENCE.

House of Lords..... 352

House of Commons..... 352

NOTES, SHORT COMMENTS, &c.

Stammering and Voice Defects. By MABEL V. O. OSWALD, Speech Specialist. With a Preliminary Note by Dr. J. N. ROBINS..... 355

Welfare of the Blind..... 356

Vivisection Experiments..... 356

Appointments, Vacancies 354

Births, Marriages, and Deaths.. 355

Medical Diary 356

Communications received..... 356

Any Reader of The Lancet

in the United Kingdom who is paying 10*d.* a week for his copy can obtain it at a little over 8½*d.*, and have it delivered by post to his address, by entering a subscription with his local bookseller or newsagent, or direct with The Lancet Office. Subscriptions may commence at any time, and copies will be despatched promptly each week at the following rates:—

3 months, 9*s.*; 6 months, 18*s.*; 12 months, 36*s.*

Cheques and P.O.'s should be made payable to Mr. Charles Good, Manager, The Lancet Office, 423, Strand, London, W.C. 2.

JOHN BALE, SONS & DANIELSSON, Ltd.

THE URETHROSCOPE IN THE DIAGNOSIS AND TREATMENT OF URETHRITIS. By Major LUMB, R.A.M.C. 10s. 6d. net.

EUGENICS AND ENVIRONMENT. By Professor C. LLOYD MORGAN, LL.D., D.S., F.R.S. Crown 8vo. 82 pp. and cover. 2s. net; postage 2d.

RELIGION AND REALITIES. By Dr. HENRY MAUDSLEY. Crown 8vo. Cloth, lettered. 3s. 6d. net; postage 4d.

83, 85, 87, 89, & 91, GREAT TITCHFIELD ST., OXFORD ST., LONDON, W. 1.

Vanity Fair Cartoons for Sale.—Doctors, Surgeons, Scientists from 1s. 6d. each. Any Cartoon published by Vanity Fair supplied. Lists free.—R. Weir & Co., High-road, Woodford, E. 18.

Price 1s. With Illustrations.

APPLICATION OF TRUSSES

to HERNIÆ. Clinical Lecture delivered at King's College Hospital By the late JOHN WOOD, F.R.S., Senior Surgeon to King's College Hospital. Reprinted from "Medical Examiner."

London: Matthews Brothers, 10, New Oxford-street, W.C.

STAMMERING, LISPING, & CLEFT-PALATE SPEECH

By Mrs. BEHNKE.

Price 1s. 6d. net (postage 2d.), of Miss Behnke, 39, Earl's Court-square S.W 5, who receives Stammerers for Treatment, and Singers and Speakers for Voice Training. REFERENCES to Medical Practitioners.

"The method is scientifically correct and perfectly effective."
—GUY'S HOSPITAL GAZETTE.

"Pre-eminent success in the education and treatment of stammering and other speech defects."—THE TIMES.

STAMMERING

W. J. KETLEY, "Tarrangower," Brondesbury, N.W.

(30 years colleague of late B. BEASLEY, Brampton Park, Huntingdon.)

Those interested in the subject should write for his book, which will be sent post free.

Doctors' A/c Forms printed in best style—250, 10/-; 500, 15/-; 1000, 25/-. Letterheads, Post Card Heads, Calling Cards, &c., at equally moderate rates. — ANDERSON & SON, 1, Hill-place, Edinburgh. Samples sent on request.

SOUTH AMERICA
WEST INDIES
SPAIN PORTUGAL
PANAMA BERMUDA
CENTRAL AMERICA
GIBRALTAR MOROCCO
ATLANTIC ISLES EGYPT
STRAITS · CHINA JAPAN
THE ROYAL MAIL STEAM PACKET Co
18 MOORGATE STREET LONDON EC

CAPSICUM
"GAMGEE TISSUE."

Sole Proprietors and Manufacturers:
ROBINSON & SONS, Limited,
Chesterfield.

INSTANTLY SOLUBLE
CONDY's CRYSTALS
(The Best of the Permanganates)
HANDY, SAFE, CHEAP
2-oz. size 1s. 3d.—CONDY'S, 65, Goswell Rd., London.

CUXSON, GERRARD & CO. LTD.

There is ten years' Ligature experience behind every Sanoid Tube of Catgut. Try a Case to-day at our expense.

SANOID

We use the right Catgut, the right Sterilizing processes, and the right solution—but we leave out the fancy rice.

OLDBURY, NEAR BIRMINGHAM.

DR. CHAUMIER'S
GLYCERINATED AND REINFORCED **CALF LYMPH.**
THE CHEAPEST AND MOST ACTIVE LYMPH.
PREPARED under the MOST MINUTE ANTISEPTIC PRECAUTIONS.
Supplied in Tubes, sufficient to vaccinate 1 or 2 persons, at 8d. each; 10 persons at 1s. 3d. each, 25 persons at 2s. 3d. each. Collapsible tubes for 40 vaccinations 3s. 9d. each Postage and packing 2d. each extra.
ROBERTS & CO., 76, New Bond St., LONDON, W

Prepared strictly in accordance with the methods advocated by Dr. S. Monckton Copeman, F.R.S.

JENNER INSTITUTE
ASEPTIC GLYCERINATED
CALF LYMPH
Tubes, 1s. each, 10s. per dozen. Postage 2d.
Half Tubes, 3 for 1s. 6d. 5s. per dozen. " "
Telegrams: "Silicabon, London." Telephone No. 1347 Battersea.
Postal Orders and Cheques to be made payable to JAMES DOUGLAS.
JENNER INSTITUTE FOR CALF LYMPH,
73, Church Rd., Battersea, London, S.W. LTD.

Methods of Treatment OF FRACTURES OF THE FEMUR.

BY JAMES DRIBERG, M.C., F.R.C.S.,
LATE CAPTAIN, R.A.M.C.; SURGICAL REGISTRAR, LONDON HOSPITAL.

IN no branch of surgery has the present war done more to modify treatment than in that of fractures of the femur, and not only to modify but also to simplify the treatment. Whereas in pre-war days a different splint was regarded as more or less specific for each variety of fracture, the present method is to treat all forms of fracture of the femur, and even of the whole leg, in a Thomas knee-splint.

By this means every sort of deformity can be entirely overcome and an ideal result obtained, whereas it is to be remembered that in the pre-war days shortening of from one to two inches was common with a simple fracture, and the results of compound fractures often hopeless.

It is true that in many cases of war wounds with gross destruction of bone and tissue the ideal has been impossible to attain; but these war wounds are, we hope, things of the past, and the object of this paper is to apply the methods learnt and studied in the war to civil practice, in which, happily, compound fractured femurs are rare, and seldom do we see the ghastly shattering of a limb as may be caused by a high-explosive shell.

It is not difficult to see why the treatment of fractured femurs should have improved to so great an extent. In civil hospitals before the war there would seldom be more than 15 to 20 fractures in the same hospital at the same time, and these under the care of various surgeons and house surgeons, all working independently. Whereas during the last two or three years it has been possible to go to any military fractured femur centre and see anywhere up to 500 cases, all under the care of the same surgeon (with, of course, adequate assistants). The treatment of these large numbers of fractured femurs has been systematised—team work has been introduced, and it has been possible to compare results on a scale which has never before been practicable. The natural outcome of this is that the treatment of fractured femurs has been vastly improved.

The treatment of fractured femurs falls automatically into two main groups: (1) the surgical; and (2) the mechanical. They are both important, but it must not be forgotten that the surgical is the life-saving treatment, and therefore must always take precedence, when necessary, of the mechanical.

I. SURGICAL TREATMENT.

This naturally confines itself to compound fractures—and whereas in war-time the greater percentage of fractured femurs were compound, in civil practice the reverse holds good. In war wounds energetic surgical treatment had to be adopted—the wounds widely excised, damaged tissue excised, muscle cut away till healthy, bleeding, contractile fibres are reached, all fragments of metal and clothing extracted—because of the great dangers of infection partly by ordinary pyogenic organisms and partly by specific gas-forming bacilli, which were so disastrous to life and limb before adequate surgical treatment was adopted. The wound should not be stitched, but should be packed with gauze soaked in flavine, brilliant green, or some form of antiseptic; this dressing should not be changed, and the wound should be closed by delayed primary suture on the third day, with a rubber drain inserted at the lower end for 24–48 hours.

In civil practice if there is any suspicion of gross infection, such as in badly lacerated railway or other accidents, these same surgical measures should undoubtedly be carried out, and so eliminate the sepsis that used to be so common and disastrous. If there is extreme shock this has to be treated by the usual methods—the application of heat and the injection of morphia, or strychnine, or of some other stimulant. There is also no doubt that in cases of shock, especially if associated with hæmorrhage, blood transfusion is of great value. When the patient is fit for operation the depressing effects of chloroform and ether may be obviated by administering gas and oxygen anæsthetic.

In most cases it will be found that these compound wounds heal well, and with little trouble. But if sepsis supervenes dependent drainage is essential. If drainage is not satisfactory the pus tracks up the thigh towards the hip-joint, especially along the adductor and ham-string muscles, and along the sheath of the sciatic nerve. The temperature chart taken on a "septic" character, the pulse-rate rises, the tongue is dry and dirty, an intractable diarrhœa may set in, there is risk of secondary hæmorrhage, and if adequate drainage is not supplied both limb and life are in danger.

Secondary hæmorrhage.—Secondary hæmorrhage, which used to be the bugbear of military surgeons, is now, fortunately, becoming more uncommon. It is treated by tying the bleeding point; if this is not possible the main artery may have to be ligated, but this only too often ends in gangrene and subsequent loss of the limb. If a severe hæmorrhage has taken place intravenous transfusion of normal saline gum solution or blood may be necessary.

Tetanus.—Another condition in compound fractured femur which may require surgical treatment is tetanus. In every case where dirt has entered the wound it is advisable to give a prophylactic dose of antitetanic serum of 1500 units, followed eight days later by a smaller dose. If tetanus supervenes any drastic treatment, such as amputation, is contra-indicated. Various sedatives have been used, but experience has shown that the best is morphia—in ¼ gr. doses, given four-hourly, or as often as is necessary to control the spasms. Large doses of antitetanic serum (10,000–12,000 units a day) should be given intramuscularly. Intrathecal injections have not been found to give better results, and have been more or less universally discarded. The severe spasms of the thigh muscles in the "local" form of tetanus may interfere with the extension and position of the bone fragments, but they are usually amenable to treatment. In one case, under Major E. C. Lindsay, R.A.M.C., and operated on by Colonel Percy Sargent, D S O., the spasm of the adductors was so severe and uncontrollable that eventually the obturator nerve had to be exposed and crushed, with a satisfactory result.

II. MECHANICAL TREATMENT.

This consists of (*a*) fixation of the limb; (*b*) extension of the limb; (*c*) suspension of the limb.

Before proceeding to the consideration of these three it is necessary to say a few words about the bed. Any hospital or other bed with an iron framework will suffice, and it is not necessary to have a special mattress with a movable segment for dressings; for, by the method presently to be described, it is easy for the patient to raise his body well clear of the bed for dressings, bed-pan, and other nursing necessities.

Attached to the bed is a wooden framework for the purpose of extension and suspension of the limb, and this should be as simple as possible; there should be two upright bars at the foot of the bed, one at each corner, reaching about 5 feet above the level of the bedclothes. These are joined by a cross-bar at the top and a cross-bar about 2 feet lower down; this lower cross-bar can be extended outwards on either side if the fracture is in the upper one-third and abduction is required. At the head end of the bed are two similar upright bars, but these are clamped on in the centre of the bed about 4 inches apart. From the top of each of these is a longitudinal bar running to the upper cross-bar at the foot of the bed, placed in position for either leg with the requisite amount of abduction. Each of these longitudinal bars has four pulleys on it, one at the foot end, one in the middle about the level of the patient's pelvis, and two at the head end.

Having dealt with the bed and the framework, and having got the patient into bed, it is now possible to consider the fractured limb.

(A) FIXATION.

By fixation is meant the application of a splint to the fractured leg and the retention of the leg to, or in, that splint. Many splints have been used, the best known being Liston's, Macintyre's, Hodgen's, and the Thomas knee-splint. Gradually every form of splint has been discarded by the majority of surgeons in favour of the Thomas knee-splint or one of its modifications, and this is the only splint whose method of application need be described. There may be a few forms of fracture, especially of the upper one-third, which are more easily treated in a Hodgen's splint; but there is no type of fractured femur which cannot be treated adequately in a Thomas knee-splint.

Before the splint is actually applied the leg has to be prepared in some way so that it may be fixed in the splint. To do this a general anæsthetic should be given, unless

contra-indicated by the general condition of the patient or some concomitant disease, such as Bright's, diabetes, &c. All manipulation of the leg is painful, and an anæsthetic helps both the patient and the surgeon. The various methods of fixing the leg are :—

1. *Methods which Obtain Traction from the Skin Surface.*

(*a*) *Adhesive strapping.*—This is probably the best in all cases where traction is applied directly to the skin surface. The method of application is so well known that it is unnecessary to describe it, except to say that it need not be applied above the knee. The skin of the leg need not be shaved beforehand. The purpose of shaving was to make removal of the strapping more comfortable, but by the time the strapping is ready to come off the hairs will all have grown again. And, in any case, strapping can be painlessly removed with ether or turpentine.

(*b*) *Glue.*—This was first introduced by Major M. Sinclair, C.M.G., of the R.A.M.C. It consists of commercial glue made up according to the following formula: glue, 50 parts; water, 50 parts; glycerine, 2 parts; calcium chloride, 1 part; thymol, 1 part.

Two strips of gauze, 8-fold thick and 5 inches wide, are cut long enough to reach from the knee to 6 inches below the bottom of the Thomas splint. The leg is then washed with a solution of sodium bicarbonate (℥i. ad Oi.) in order to remove all grease from the skin. The glue, heated to melting point, is then applied to the skin of the leg between the ankle and the knee as evenly as possible. It is preferable to apply this with the hand and not with a brush, for with the hand it can be applied more evenly; and also this method ensures that the glue is not too hot for the patient's skin. The two strips of gauze are then placed evenly on the glue, one on either side of the leg, and about as high up as the tuberosity of the tibia. The whole leg from just above the ankle to just below the knee is bandaged firmly, but evenly, with a 3-inch cotton bandage. It is essential that the bandage and gauze should be evenly applied, for any unevenness is bound to cause blistering of the skin. If, after the glue has dried, the bandage is too tight, it can be snipped with a pair of scissors. A common place for blistering is over the tendo Achillis, and here, if necessary, the bandage can be cut for an inch or two without harm.

The glue takes about ten minutes to dry, and the chief advantage is the ease and speed with which it is applied. Its disadvantages are that it has to be renewed more frequently than strapping and is rather apt to blister the skin, causing pain and discomfort to the patient.

(*c*) *Mastisol.*—This is a rubber solution which is applied in exactly the same manner as glue. It dries more rapidly, but is rather more apt to blister the skin.

2. *Methods which Obtain Traction Directly from the Bone.*

(*a*) *Fixation by calipers.*—This is the ideal method, as it gives direct control of the lower fragment of bone, and in careful hands no sepsis or ill-results ensue. The calipers are shaped like ordinary ice-tongs, the ends being pointed, and, when opened at the angle at which they will be applied, in the same straight line with each other. The first calipers to be used were ordinary commercial carpenter's calipers, the ends being curved and bent in. Since then various types have been devised, the latest and best being that of Major M. G. Pearson, S.A.M.C., which has in the handles a screw adjustment which prevents any further penetration of the bone once the calipers are fixed in position.

There are two methods of applying the calipers. In the first slight penetration of the bone is aimed at, and this method is adopted if fixed extension is afterwards going to be applied, for otherwise any movement on the part of the patient which eases the extention momentarily might cause the calipers to slip. In the second method the calipers are introduced down to, but not penetrating, the bone. With weight and pulley extensions there is a constant pull at all times, so there is no tendency for the calipers to slip. The points of the calipers get a perfect grip on the bone, which in maintained by the pull of the weight; the screw adjustment in the handles of the calipers prevent penetration of the bone, and the extension cord attached to the handles prevents the points of the calipers coming apart.

The technique of applying the calipers is simple, but all due antiseptic and aseptic precautions must be taken.

The skin round the knee having been shaved and prepared for operation, and the patient having been given a general anæsthetic (gas and oxygen is usually quite sufficient), an incision is made with a scalpel down to the bone on each side immediately above the thickest and most prominent portion of the condyles of the femur. Each incision should be half an inch long. If the incision is too short pressure sepsis may result in the skin and cause considerable pain. The sterilised calipers are then taken and the points inserted down to the bone, one in each incision. If penetration of the bone is desired the points are hammered in with a mallet to a distance of from ¼ to ½ in., and the screw in the handle of the calipers adjusted till the handles just touch each other. In no case is it necessary to drill a hole in the bone beforehand. If penetration of the bone is not desired the same steps are carried out, except that the points of the calipers are not hammered in. The handles of the calipers are then tied together to prevent separation of the points. A piece of cord about 3 ft. long is then tied to each handle. To keep the incisions over the condyles clean it is merely necessary to apply to each a piece of gauze soaked in iodine or flavine or some other antiseptic; this piece of gauze need never be removed, but every two or three days a few drops of the antiseptic should be poured on to it.

Calipers are contra-indicated in fractures of the lower one-third actually involving the knee-joint if there is distension of the synovial membrane, because of the danger of damage to the membrane; also in lower one-third compound fractures with T-shaped fracture into the knee-joint, for then the pressure of the calipers may cause pocketing and accumulation of pus between the fragments.

General diseases, such as diabetes, &c., are no contra-indication, for the calipers may be applied under gas and oxygen or local anæsthetic. The same is true of a septic wound over the condyles, for the introduction of calipers actually into a septic wound neither increases the sepsis nor inhibits healing, provided the calipers are only applied down to the bone and there is no penetration.

Occasionally, in spite of careful technique, a slight, though painful, skin sepsis may arise, or the calipers may slip owing to an orderly or nurse relieving the extension by lifting the attached weight (a thing which they should strictly be warned not to do); in these cases the calipers should be removed and reinserted at a somewhat higher level.

The patient usually suffers a little pain and discomfort for 24 hours, sufficient to warrant the injection of morphia gr. ¼ before the anæsthetic.

The two risks of calipers are bone sepsis and penetration of the knee-joint; with careful technique neither of these ought ever to occur.

(*b*) *Ankle calipers.*—They are similar to, though smaller than, the femur calipers. They are applied in exactly the same way, and with the same precautions, into the thickest part of the malleoli. They are useful in those cases where, owing to the involvement of the knee-joint, &c., femur calipers are contra-indicated; and especially so if there should also be a fracture of the tibia or fibula.

(*c*) *Hey Groves's transfixation pin* is a steel rod which is driven through the lower end of the femur just above the thickest part of the condyles—traction being maintained from either end of the rod. This has to pass through the cancellous and easily infected portion of the bone, and in removing the pin one end—which has been exposed, has possibly become septic and is difficult to re-sterilise—has to be pulled through the bone, and infection may result.

(*d*) *Tibial screws.*—These are two silver screws, 2 in. long, which are screwed 1¼ in. into the tibia about 6 in. below the knee-joint. A cord or tape is attached to each screw so as to maintain traction. They have no particular advantage, but may be useful if the skin of the leg blisters badly with strapping or glue.

(*e*) *Schutro's stirrup.*—This consists of a short, narrow steel rod, which is inserted between the tendo-Achillis and the bone, and rests against the os calcis. Traction is maintained from each end of the rod. This method, too, has no marked advantage over others; and in unskilled hands the steel rod has been known to cut through the tendo-Achillis—a most unfortunate accident.

Strapping and Calipers.

The next consideration is which of these eight methods to apply. Except in special cases it is probable that only one of two methods will be adopted; these two are strapping and calipers. There is no doubt that the best results are obtained with calipers. Having a direct control on the lower fragment ensures more accurate correction of any displacement. With this method the period of convalescence is decreased; for, as massage and passive move-

ments of the joints can be applied from the very beginning, the patient, when union has taken place, is able to walk with a good, strong, muscular, well-nourished leg. Moreover the increased nutrition, due to massage, &c., very probably has a beneficial effect on, and hastens, union; for it is a fact that patients who have calipers applied do get union somewhat sooner than those who have some other form of fixation.

There are certain cases, which have already been discussed, where calipers are contra-indicated. In these cases strapping should be used. Also, where aseptic and antiseptic conditions cannot be guaranteed the caliper method, perhaps, should be discarded; for any sepsis round the caliper points, though not necessarily of surgical import, causes great pain and necessitates the removal of the calipers. And, finally, the personal equation of the medical attendant and the facilities at hand for operative treatment have to be taken into consideration.

Application of the Splint.

The leg having been prepared in one of these methods for fixation, the next step is the application of the splint. Some surgeons prefer a Thomas splint with a large ring, but most use one with a small ring, on the grounds that it is more comfortable for the patient and allows less lateral movement at the seat of fracture.

Having chosen a well-fitting Thomas knee-splint, it is passed on to the leg. An assistant should throughout apply traction on the leg from the ankle, in order to limit as far as possible movement of the bone fragments and consequent damage to the tissue of the thigh. The leg is then supported in the splint by slings. These are short lengths of 3-inch flannel bandage. Each one is looped over the inner bar of the Thomas splint, the doubled bandage is then passed under the thigh and fixed in position over the outer bar by safety-pins or by 3-inch paper clips, which are much more convenient and easy to use. The sling under the upper end of the lower fragment should be pulled tight and should always be kept tight, for this sling corrects the backward displacement of the lower fragment. By having this sling tight the lower fragment is pulled forward into position with the upper, and the anterior arch of the femur is restored. Malunion of the femur with backward displacement of the lower fragment is the most disabling form of malunion known. The other slings merely form a trough for the leg, and are slackened or tightened according to the comfort of the patient.

The ring of the splint should fit snugly against the tuber ischii, the cord from the strapping or the calipers or the gauze from the "glue method" is tied firmly to the end of the splint, and the leg is now "fixed" in the splint.

If strapping has been used it is advisable to bend the Thomas splint to an angle of about 15° at the level of the knee-joint. This, of course, is done before the Thomas splint is put on to the leg. By doing this the knee is slightly bent and the gastrocnemii muscles are relaxed, so helping to correct the backward displacement of the lower fragment.

If calipers have been applied a straight splint should be used and a "knee-flexion splint" applied.

The "knee-flexion splint," introduced by Major M. G. Pearson, consists of the lower part of an ordinary Thomas knee-splint cut off to a length of 2½ ft. At each upper free end is a joint and a thumb-screw. The knee-flexion splint is fixed to the under surface of the Thomas knee-splint by the thumb-screws, which should be opposite the knee-joint. The flannel slings below the knee are now transferred from the Thomas to the knee-flexion splint, and the leg below the knee is allowed to hang in the knee-flexion splint. This it will do by its own weight, for it must be remembered that when calipers are applied the whole of the leg below the knee is free. By means of the joint between the upper end of the knee-flexion splint and the thumb-screw the splint can be moved up and down, and so passive movement given to the knee-joint daily throughout the whole time that the patient is under treatment. This is the greatest advantage of the caliper method, for it obviates any stiffness of the knee-joint, which is so common with other forms of fixation and which is nearly as crippling as malposition of the femur. The lower end of the knee-flexion splint is tied to the lower end of the Thomas splint by a hook and chain, and can be adjusted to any angle.

To prevent "foot-drop" a small, rectangular wire foot-piece is strapped on either to the Thomas or the knee-flexion splint, and the foot fastened to this in correct position. The most convenient way is to take a strip of gauze, fix one end to the sole of the foot with glue, and tie the other end to the top of the foot-piece. This leaves the dorsum of the foot free for massage, and also allows of a certain amount of passive movement of the ankle-joint.

(B) EXTENSION.

There are two main methods of extension—fixed extension and "weight-and-pulley" extension. It must be remembered that fixing the leg in the splint does not provide extension. It may appear to do so temporarily, but if no further measures are adopted the leg very soon lies quite loose in the splint, partly due to stretching of the gauze or the cord, and partly due to relaxation of the muscles of the thigh.

If fixed extension is to be used the bottom end of the Thomas splint is tied firmly to the lower of the two wooden cross-bars at the foot of the bed, and the foot of the bed is raised 12 inches on blocks. The patient is only allowed one pillow under his head. This method of extension is very simple.

The leg is fixed in the splint, the splint is fixed to the foot of the bed, which is raised on blocks, and the body weight continually slipping away forms a counter-extension and pulls the leg out. If several pillows are allowed the patient puts them under his shoulder, and this immediately releases the extension. In most cases of recently fractured femurs, the leg can be pulled out to its correct length in 24 hours or even less. When this result has been obtained, and that can only be determined by careful measurements and by the X ray, the patient can be allowed an extra pillow, but this may have to be taken away again if the leg shortens at all; it is most important to keep up full extension for the first three to four weeks. The patient may complain of discomfort for the first day or two—it is usually due to the unaccustomed position—but he very soon gets used to it and becomes happy and comfortable. It is unusual for there to be any pain in the seat of fracture once extension has been applied. There may be pain in the thigh due to trauma received at the time of injury, but this is usually relieved by small doses of aspirin.

If "weight and pulley" extension is employed, the lower end of the splint is again tied to the cross-bar at the foot of the bed; but the cord from the strapping or calipers, instead of being tied to the bottom of the splint, is attached to a weight and passes over a pulley which is screwed into the cross-bar opposite the lower end of the splint. The foot of the bed is not raised on blocks. A weight of 7–10 lb. is usually quite sufficient, and it is seldom necessary to use more than 15 lb. In fractures several weeks' old with some union in malposition it may be necessary to have a heavier weight. It must be remembered that when the calipers do not penetrate the bone they are kept in position chiefly by the pull of the extension weight. Consequently, anyone in charge of the patient, such as nurses, orderlies, &c., must be carefully warned never to lift the weight; for this immediately relaxes the extension and the calipers are then liable to slip. In order to ensure against this accident occurring it may be as well to have a small wire cage fitted to the foot end of the bed, inside which the weight may hang. The cage will not only remind the staff that the weight is not to be disturbed, but it will also prevent the weight from being knocked by passers by.

The advantage of the "weight and pulley" method is that the foot of the bed need not be raised and the patient can be propped up as much as is desired by pillows, bed-rest, &c., which in elderly or bronchitic patients greatly reduces the danger of hypostatic pneumonia. With the "weight and pulley" extension the patient sometimes complains of pressure pain over the tuber ischii, and occasionally a definite sore appears. With fixed extension this never happens, for the body weight pulls the upper end of the thigh out of the ring of the Thomas splint.

But apart from these there is nothing to choose between the two methods. Equally good results are obtained with both, and after the first day or two the patients are equally comfortable in either position.

The other methods of extension are not so satisfactory, and need only be shortly described.

Spring extension.—The cord of the strapping or calipers is tied either to a powerful elastic or a strong steel spring, which in turn is fixed to the lower end of the splint. With this the amount of extension is difficult to gauge and regulate.

Screw extension.—As in the Wallace-Maybury splint.

The patient's leg is fastened to a wooden foot-piece, which is pulled away by an adjustable screw. This is not a very comfortable method for the patient, nor is it very accurate, though it is sometimes useful for purposes of transport.

(C) SUSPENSION.

The object of suspending the limb is three-fold: (1) it enables the patient to move about comfortably in bed; (2) the necessary rotation of the lower fragment may be obtained so as to correspond with any outward rotation of the upper fragment; (3) in the "weight-and-pulley" method of extension the ring of the splint can be kept close up against the tuber ischii and prevented from slipping over that bone, thus ensuring satisfactory counter-extension from the tuber ischii.

In order to suspend the leg four lengths of cord and four weights of about 5 lb. each are necessary.

The cords are attached to the splint, two at the foot and two at the upper end just below the ring—one on the inner and one on the outer side. They are then passed through the pulleys which have been fixed to the two longitudinal bars of the wooden framework, and finally the weights are attached to the free ends of the cord and hang down behind the patient's head. The two cords from the foot end pass through the two pulleys at the foot end of the bed and then through two of the four pulleys at the head end. The two cords from the upper end of the splint pass first through the two pulleys midway along the longitudinal wooden bars and then through the remaining two pulleys at the head end.

In order to get outward rotation of the leg and lower fragment it is merely necessary for the weights attached to the two inner suspension cords to be slightly heavier than those attached to the two outer suspension cords.

With this suspension method the patient can lift himself off the bed with the greatest ease. He should, of course, have a rope with a wooden handle above his head by which he pulls himself up, at the same time assisting by bending up his sound leg and levering himself off the bed with his heel. The whole weight of the fractured leg is taken by the four suspension weights and the patient has practically only the weight of his trunk to support. Most patients can easily raise themselves 12–18 inches off the bed, and remain in that position long enough for purpose of dressing, nursing, &c.

If the patient is very weak and debilitated another method can be used for keeping him raised up.

A strong piece of flannel, 2 ft. long by 10 in. wide, is passed under the patient's back. Each end of the flannel is looped and through each loop is passed a narrow bar of iron (the bar of a Thomas splint, cut down, answers the purpose very well); each bar is fixed from its centre to the longitudinal wooden bars of the framework by a hook and chain. The flannel binder can be adjusted to any height and the patient remains raised comfortably for as long as is necessary.

Five pounds is the average weight necessary for each suspension cord, but this varies, and can be adjusted to the size and weight of the patient; and, as already mentioned, outward rotation of the leg may be obtained by increasing the weight attached to the inner two cords.

To recapitulate, the steps in "putting up" a fractured femur are: 1. The wooden framework is clamped on to the bed. 2. Some method of traction is applied to the leg. And of all the methods it is probable that only one of two will be adopted—either strapping or calipers. 3. The splint is put on; the slings applied and the leg firmly fixed in the splint; knee-flexion splint adjusted if it is used. 4. Extension (fixed or "weight and pulley") is applied. 5. The leg is suspended. This is the procedure in every case of fractured femur. Variations in the treatment of individual cases will be considered later on.

So far nothing has been said about fixing the bone fragments by direct control at the seat of fracture—i.e., by plating, wiring, or screwing. The plating of fractures is a large subject and quite beyond the scope of this article. Moreover, one of the objects of this article is to show that perfect results may be obtained by other methods. Plating, in the hands of experts, may give excellent results, but in inexpert hands may have most disastrous consequences. Furthermore, plating does not diminish the length of time the patient has to remain in bed, nor does it shorten the period of convalescence. It is merely a method of internal, as opposed to external, splinting. And as equally good results may be obtained by other methods, it seems unnecessary to expose the patient to the risk of a lengthy anæsthetic and a severe operation. There is a small percentage of cases in which plating may be necessary; these will be considered later on amongst the complications of fractured femur. In no case of compound fracture should plating be even suggested.

VARIETIES OF FRACTURE.

The next step to consider is the varieties of fractured femur, the position of the fracture, and the bony displacements. The varieties of fracture—transverse, oblique, spiral, comminuted, &c.—have been so often and ably described in text-books that they need not be discussed here, especially as they each require identically the same treatment. Their only importance is with regard to the length of time extension should be maintained, and they will be considered later on under that heading.

Of much greater importance is the situation of the fracture. Of late it seems to be the fashion to divide the femur into fourths, but this has absolutely no advantage over the previous system of division into thirds.

1. *Fracture of the Upper Third.*

(*a*) *Intra-capsular fractures of the neck of the femur* show little displacement, and merely require fixation, slight extension, and extreme abduction until union is complete.

(*b*) *In extra-capsular fractures of the neck* shortening is the main displacement to be overcome; this requires considerable extension and usually slight abduction. The result has to be accurately checked by X ray and the tape measure.

(*c*) *Fracture of the upper one-third of the shaft.*—The usual situation is just below the small trochanter, and the displacement is typical and very general. The displacement of the upper fragment is three-fold—flexion, abduction, and external rotation. Flexion is caused by the upward pull of the iliopsoas muscle; abduction is caused by the glutei; and outward rotation by the external rotators of the hip—obturators, pyriformis, quadratus, and gemelli. Consequently the lower fragment has to be similarly displaced in order to bring it in line with the upper. External rotation is obtained by increasing the weights attached to the two inner suspension cords; abduction, by prolonging outwards as far as necessary the lower cross-bar to which the lower end of the Thomas splint is fixed, and flexion is already provided for by raising the lower end of the splint up to the level of the lower cross-bar.

It has been stated that in order to get true abduction both legs should be abducted, otherwise the patient twists himself round in bed, tilts his pelvis, and false abduction occurs. This is not correct. For the abduction that is applied in order to bring the fragments into line takes place at the seat of fracture and not at the hip-joint, and there is no inducement for the patient to tilt his pelvis; for this position, which restores the natural alignment of the leg, is the position of greatest comfort and rest. That this is so can be proved by examining the anterior superior iliac spines of a patient with one leg abducted; it will be found that the spines are at the same level. In this the treatment of upper-third fractures varies from that of tubercular disease of the hip-joint, in which double abduction is necessary. An exception to this is also found in intra-capsular fractures of the neck of the femur, where extreme abduction is desired, and it is advisable widely to abduct both legs. In upper-third fractures the lower fragment is pulled up by the hamstrings and inwards by the adductors; this is corrected by extension. In fractures above the small trochanter the only difference in displacement is that the upper fragment is not pulled forward by the ilio-psoas.

2. *Fractures of the Middle Third.*

The upper fragment is very slightly abducted and externally rotated; the lower fragment is displaced upwards and inwards. This displacement is usually easy to correct; the shortening is reduced by extension, and any "sagging" or backward displacement by tightening the supporting slings. It is essential to keep these slings firm in order to restore the anterior curve of the femur.

3. *Fractures of the Lower Third.*

In these the lower fragment is always pulled back by the gastrocnemii, and usually adducted and slightly rotated outwards by the adductor magnus. The lower fragment is also pulled up by action of all the thigh muscles.

Shortening is corrected by extension; and the backward displacement by tightening the sling under the lower fragment, and by flexing the knee, which relaxes the gastrocnemii muscles. Flexion of the knee is easily obtained by using the knee-flexion splint, already described. The use of calipers is more essential in this than in any other type of fracture, for often it is the only possible method of controlling

the short and easily displaced lower fragment, and of allowing the full amount of knee flexion that is so essential.

In all fractures backward displacement is more or less easy to correct by tightening the supporting slings. Lateral displacement can be similarly corrected. If, for example, the lower fragment is displaced inwards and is not corrected by extension, a flannel sling is passed round the thigh at the level of the upper end of the lower fragment and pinned securely to the outer side bar of the splint. This will pull the lower fragment out, and the sling can be further tightened daily until good position is obtained and maintained.

Of the various fractures those of the upper third usually require more extension than those of the middle or lower. That shortening and displacement have been correctly reduced is decided by inspection, palpation, measurement, and radiography. Inspection and palpation will show whether the limb looks normal as regards size and shape, and whether the anterior and outward curve of the femur has been correctly restored, but the only true and satisfactory tests are measurement and radiography.

Transverse fractures of the femur are rather more difficult to get into perfect position than the other varieties, but once in position their natural tendency is to keep in that position. Oblique, spiral, and comminuted fractures are very liable to "telescope" if good extension is not kept up.

In all varieties of fracture, except the transverse, it is desirable to apply sufficient extension to obtain 1 cm. lengthening; the reason for this is that as soon as the patient starts to walk there is a tendency for the callus to contract and the limb to shorten up just a trifle. This is more particularly marked in cases where there has been a prolonged sepsis and the callus is "sticky."

Both legs should be measured daily for the first week or ten days in order to be certain that sufficient extension is being applied; after that it is only necessary to measure the legs every few days. Sometimes, especially in compound comminuted fractures with much laceration of the thigh muscles, there is over-correction with lengthening of the limb. In this case the amount of extension is reduced, in one method by decreasing the amount of the weight attached, and in the other by allowing the patient more pillows or by putting the foot end of the bed on lower blocks. The legs should be measured in centimetres, which decreases the margin of error, and can be carried out either with a tape measure from the tip of the anterior superior iliac spine to the internal malleolus or with a wooden measure from the under-surface of the anterior superior spine to the upper border of the patella.

It is convenient to chart the length of the leg each time. It is measured on a special chart drawn out in centimetres. The normal line is the length of the sound leg, and the amount of shortening or lengthening is charted above and below this line respectively.

Radiography Essential.

Radiography is absolutely essential if good results are to be obtained.

The patient is photographed in bed with a portable X ray apparatus. Either two views, antero-posterior and lateral, are taken, or the leg is photographed stereoscopically from the anterior view. If the position of the bone is not satisfactory an attempt is made to correct the deformity by the methods described and a further radiograph taken. Once the position and length are satisfactory it is only necessary to radiograph the leg every two or three weeks in order to be certain that the correct position is being maintained. It is convenient and useful, though not always possible, to have small reduced prints of these radiographs pasted on a board and hung by the patient's bedside.

During the entire time that the patient is in the splint massage of the whole limb and (if calipers have been used) passive movements of the joints should be carried out; it is also advisable to have massage of the sound leg, so that when the patient starts to walk all his muscles are strong, and he is able to stand up and retain his balance. Passive movement of the knee-joint of the broken leg is obtained by daily alteration in the level, and movement of the knee-flexion splint; this should at first be done very carefully and for the first two or three weeks, at any rate, by the medical attendant himself, for in the early stages any careless movement might cause some alteration in the position of the fracture, and will certainly cause pain.

Length of Time during which the Leg should be Left in the Splint.

This varies to a certain extent, but, on an average, the splint can usually be dispensed with at the end of the tenth or eleventh week. Fractures of the lower third, probably because of the excellent blood-supply, seem to unite rather quicker than those of the upper and middle thirds. Oblique, spiral, and comminuted fractures should be kept in the splint, with extension, for a week or ten days longer than transverse fractures. For in transverse fractures, provided the position of the fragments is good, the interlocking of the two ends prevents any shortening, bowing, or sagging.

The only real method of judging whether the leg is fit to come out of the splint is by palpation and the X ray. By firm palpation it is possible to estimate whether the union is firm, and whether there is any mobility at the seat of fracture. Any tenderness, on pressure, in the fracture, means that the callus is not yet firm enough. X rays at this stage are very important. They demonstrate the amount and density of the callus. The presence of callus first appears in a radiograph about the end of the fourth week as a very faint haze; this gradually increases in extent and intensity, till about the tenth or eleventh week it appears as a dense homogeneous mass, firmly knitting all the bone fragments together. In compound fractures, if there has been marked sepsis, the callus may present a honeycombed appearance. Such callus is weak and points to the need of further treatment in the splint.

Having decided, about the tenth week, that the leg may soon come out of the splint, the extension can be removed and the leg left merely fixed in the splint and suspended. In the "weight-and-pulley" method, the weight is removed and the cord tied to the end of the splint, which is loosed from the cross-bar. In the fixed extension method the bed is taken off the blocks, the patient is allowed as many pillows as he desires, and the splint loosed from the cross-bar; it will be found that the patient has slipped out of the splint for an inch or two, and it is necessary to readjust the splint so that the ring fits snugly against the tuber ischii; the cord is then fastened firmly to the lower end of the splint.

This may be called the second position and it is continued for a week or ten days. During this period the patient is encouraged to move about as much as possible in bed, in order to exercise thoroughly all his muscles preparatory to walking. It is possible and desirable for the patient to get out of bed and sit in a chair by the bedside, his broken leg being suspended the whole time.

During this period, too, massage is actively continued. And, by suspending the leg higher in the bed, the knee-flexion splint can be further dropped till the knee bends to an angle of 90°. If strapping has been used instead of calipers the leg can be taken out of the splint daily under supervision of the medical attendant and knee movements started.

About the eleventh week the leg is taken out of the splint permanently. The patient should be able to lift the leg clear of the bed, if his muscles have been kept in good tone by massage, &c., and there should also be appreciable active movement of the knee-joint. He is kept like this for a further three or four days, the leg being supported on a pillow. The leg must be carefully watched lest any bowing or sagging takes place, in which case the splint must be reapplied at once, for it means that union is not sufficiently firm.

Union being firm enough and the patient being used to freedom from the splint, he is now allowed to walk; but for at least another three months he is not allowed to put any weight on the heel, for the callus is not firm enough to take the body weight. This difficulty is overcome by the use of what are called "walking calipers" or "caliper boots." These consist of a Thomas knee-splint with the lower end cut off and the loose points turned in and fitted into a hole drilled through the heel of the boot.

Measurements.

The measurements required by the splint-maker are:—

(1) The circumference of the thigh at the level of the tuber ischii; (2) the length from the tuber ischii to ½ in. below the sole of the foot.

The splint-maker chooses a splint with a neatly padded well-fitting ring, cuts the lower end of the splint off and fits the two loose ends with a sliding screw adjustment 6 in. long. With this the length of the splint can be varied, so as to be accurately adjusted to the leg. Each of the screw

pieces has a transverse steel rod attached to the lower end 1½ in. long, which fits into a hole in the heel of the boot. The outer bar of the splint should fix into the heel of the boot 1 inch in front of the inner bar, so that when the bars are level the boot is turned out and corresponds to the natural eversion of the foot in walking. If this is not done considerable discomfort will be caused.

When the splint is on the leg and fixed into the patient's boot the heel should not touch the bottom of the boot. If it does touch the splint should be lengthened by a few turns of the screw adjustment. If the heel touches the boot the weight of the body is transmitted through the fracture and may cause bending. If the heel does not touch all the weight is taken by the tuber ischii. In a correctly fitting splint very little weight should be taken by the great trochanter or the pubic bone.

Provided both legs are of the same length, the good leg should be raised by a 1-inch patten on the boot; this is to enable the bad leg to swing clear of the ground in walking, for, of course, while in the walking splint it is impossible for the knee to bend.

At first the patient will have to be assisted and supported in walking, but usually he very soon can walk alone. It is purely a matter of self-confidence and balance; even if he were to fall down he would not fracture his leg while it was in the walking splint. Crutches are not necessary and are to be discouraged; one, or sometimes two, walking sticks may be used, but the patient quickly learns to walk without any form of support at all.

Every morning before putting on the walking splint massage and passive movement should be given; and two or three times during the day the splint should be freed from the boot and knee movements actively exercised.

The caliper boots should be worn until at least six months have elapsed since the date of fracture; by that time the splint can be discarded and the patient walk naturally and with a perfectly movable knee-joint. Here, again, an X ray is of great value. If the callus is very dense and bone canaliculi can be discovered, then the callus has been converted into true bone and can only be broken by trauma, such as would be needed to fracture any sound, healthy femur.

On first getting up the patient may find that his leg swells considerably. This will gradually disappear as his muscular and vaso-motor systems regain their normal tone. As the muscles of the thigh grow bigger it may be necessary to have a fresh splint with a larger ring.

SOME COMPLICATIONS OF FRACTURED FEMURS WHICH MAY OCCUR.

(1) *Mal-union.*—In early cases—that is, in simple fracture up to about six or seven weeks and in compound fractures up to the end of the twelfth week—it is usually possible to break down the union by hand and apply satisfactory extension. In later cases osteotomy will be required if the deformity and disability are sufficient to warrant it.

(2) *Delayed union and non-union* may be caused by (*a*) sepsis with formation of a large sequestrum; after sequestrotomy with satisfactory drainage the bone usually unites rapidly; (*b*) gross destruction of bone, so that when extension is applied the ends of the bone are too far apart for union to take place. This may be treated either by bone-grafting or by deciding to allow some shortening and relaxing the extension, so as to permit of the ends of the bone coming together. When union is taking place, but while the callus is still "sticky," increased extension will probably cause a little more lengthening without interfering with union.

Delayed union may be caused by general disease, such as debility, malnutrition, anæmia, cachexia from malignant disease, tabes dorsalis, rickets in childhood, &c. The treatment of the disease is the treatment of the delayed union; but assistance may be given by some form of passive congestion of the limb, such as Bier's treatment.

In spite of treatment a few cases of fractured femur will not unite; occasionally this may be due to pieces of muscle fascia or other tissue which have been caught between the bone ends; but usually the reason is obscure. No fractured femur should be diagnosed as a case of non-union till at least 12 months from the date of injury; and then if there is still no union, surgical treatment may be considered. It is doubtful if plating will ever help if the ends of the bone are already in good position; in these cases it is probably better to adopt some form of bone-grafting. Even when the bone has been plated the freshening of the bone ends during operation, and the increased supply of blood brought to the parts during the healing of the operation wounds probably play as big a part as the plate itself in stimulating the bone to callus formation.

(3) *Tetanus* has already been discussed.

(4) *Nerve lesions* form a subject for treatment beyond the scope of this article. It is sufficient here to say that if "foot-drop" is present an uplifting toe-spring can be easily attached to the walking caliper splint.

(5) *Neuralgic pain along the dorsum of the foot* is not very uncommon. Its cause is obscure. It cannot be entirely due to a neuritis of the sciatic nerve as it is met with both in simple and compound fractures. It may be treated (often without marked success) by drugs such as aspirin, bromide, phenacetin, &c., or by local applications—heat; cold; ointments, such as ung. methyl salicylate, 2 per cent.; formalin solution; blisters; antiphlogistine, &c. Sometimes a rubber bandage firmly applied gives relief. Unfortunately the pain is always worse at night and is often sufficiently severe to keep the patient awake. The pain, though not very amenable to treatment, usually decreases and disappears after a few weeks.

(6) *Stiffness of the knee* due to adhesions in the thigh between muscle, fascia, and bone. This is, of course, much more common in compound fracture, especially where there has been marked sepsis. The worst cases, and most difficult to treat, are when the extensors of the thigh are bound down to the bone by scar tissue. The scar may be loosened by massage and forcible flexion under an anæsthetic. Sometimes the scar can be separated from the bone by the introduction of a tenotome. If these methods fail excision of the scar will be necessary.

CONCLUSION.

In conclusion it may be said that by the methods that have been described a perfect result can be obtained in the vast majority of fractured femurs. But, like everything else, a fractured femur requires constant care and attention to detail. The adjustment of the slings, the maintenance of extension, the movements of the knee-joint, the correct suspension with slight eversion of the limb, the prevention of foot-drop, massage, and the upkeep of general health and nutrition of the patient—each of these plays its allotted part in the attainment of perfection; and if anyone is neglected the seeker after perfection is apt to be disappointed.

PERVERTED "FUNCTIONAL" ACTIVITY IN THE PRODUCTION OF JAW DEFORMITIES.

BY D. M. SHAW,

CURATOR OF THE PROSTHETIC LABORATORIES, ROYAL DENTAL HOSPITAL OF LONDON.

THE "perverted" or non-normal activities which it is desired here to draw attention to are "functional" only in so far as they are excited and exhibited in the oral preparation of alimentary substances. The "jaw deformities" that it is hoped to throw some additional light upon are those occurring among children, and chiefly recognised and estimated (in occlusion) as irregularities or abnormalities in the position of teeth, the teeth themselves emerging structurally sound and normal in shape. The various dental units are constructed faultlessly and are ready (we may assume) *to time*. They are then potentially available for building into a machine which is highly efficient as a food-preparing mechanism when the units are normally arranged, and which then also, when normally exercised, is adapted to maintain the health and integrity of its various parts and investing tissues. But in the abnormalities frequently seen the functional efficiency is greatly depreciated; the specific shapes that in man have for ages remained morphologically constant are there present, but the teeth are thrown together in such disorder as to more or less abort their utility, and the normal *rhythmical* activity in mastication becomes impossible. It will be agreed, and without touching at all upon the many other consequences involved, that this is a somewhat poor beginning for that part of the alimentary processes over which we could safely exercise the most direct and most knowledgable control.

The "Soft Food" Theory.

Any references to current theories of causation will here be closely restricted to what may seem helpful in bringing my proposition into reasonably clear view. Absence or insufficiency of the harder foodstuffs has long been held to be a dominant cause of malocclusion. The "soft food" theory and the indicated remedy have been insistently kept in the forefront by several accepted authorities, and in the general lay and professional mind there is, at any rate, a pious if not a very active belief in the soundness of that view. While no one seeks to deny that by lack of functional exercise the jaws *may* fail to attain their full development, there are yet large groups of malocclusion cases (involving protrusions, retrusions, contracted arches, spread arches, and excessive anterior overlap) wherein this explanation has been rejected by the majority of those interested in the subject. The limb muscles of different children undergo widely differing amounts of exercise; in many individuals the exercise may be deficient in amount, but no concomitant bone deformity ensues.

Professor A. Keith, whose suggestion that the "sensitising" action of the pituitary secretion may be at fault was so finely lit up by the searching beam he cast into the less-explored field of comparative odontology, is at the same time in entire agreement that one should also give exhaustive attention to those "grosser" agencies which are known to alter and regulate growth—"the mechanical impulses which arise from the natural use of parts."

Quite a number of alternative explanations have been offered with varying degrees of confidence and support, the difficulty and low solubility of the problem being illustrated by the emergence, for example, of theories of causation, some of which are diametrically opposed—viz., the theory held by Dr. Sim Wallace and Sir Arbuthnot Lane that contracted or narrow jaws are caused by a feeble musculature of the tongue resulting mostly from the use of *soft* food, and the explanation advanced by Professor H. P. Pickerill that narrow jaws are due to the use of food that is too *hard* or *tough*. Again, in regard to defects or wrong use of the respiratory ports as a factor in jaw deformities, although the vitiating physical or mechanical conditions that exist during *free mouth* breathing are distinctly different to the conditions during *obstructed nasal* breathing, and therefore the effects directly due to the former must differ markedly from those due to the latter cause, yet in articles and discussions those important differences are usually either glossed over or ignored.

The Existence of Positive Factors.

Whether or no in modern times a harmful change has taken place in the kind of food given to children, the number of meals per day has probably not lessened and the total time given to eating may be taken as not less now than was customary among children in the near or more distant past. Therefore, as the mouth is in *some* kind of activity during that time, inquiry into the effects or defects arising should not be confined to consideration of the merely passive or negative factors. The absence of positive factors cannot be assumed, and they should be searched for and their value as far as possible ascertained by close and persistent observation of the *machine at work* in large numbers of children. For some years past I have missed no opportunity (and have artfully created a good many) of observing the different ways in which the mouths of children deal with food.

A direct view of what is going on in the mouth is, of course, very much cut off and masked by the cheeks and lips, but this drawback is in some degree compensated for by the fact that watchful observation of those same moving curtains will often betray what is happening behind the scenes. Correct interpretation of the mouth and jaw movements which take place and of the probable results of the various efforts in manipulating food will, it is reasonable to believe, be favoured a good deal by previous close study of the chewing mechanism in children and adults, and not only in normal but also in abnormal, crippled, and mutilated dentitions. The small amount of interest up to the present taken in the physiological morphology does not warrant, however, the entering into details, "tedious" details that are in reality essential in this as in any other mechanism. The following is a rough summary of the results of observation of many groups of children.

1. There is in many cases an excessive amount of manipulation of food *by the tongue*. The tongue movements vary from very languid to very energetic, sweetened foods usually exciting the tongue to the greater activity, especially in upward pressure.

2. The normal work of fine reduction *by the cheek teeth* is only partially carried out, and is often not performed at all. Morsels are merely rolled about in the mouth, with an occasional squeeze from tongue or teeth, and what are in reality remarkable feats of food-bolting pass quite unnoticed. The performances of some of these juvenile, yet often well-mannered, "bolters" are so mysterious and *finished* that it is almost impossible to understand how it is done.

3. Certain foodstuffs which constitute a large proportion of the daily intake (including cereals and breadstuffs permeable and softened by saliva, sweetened puddings, &c., porridge, sweets, jam, and confectionary) are manipulated and "mashed" by the tongue *against the anterior surface of the palate*, partly to break up their consistency and partly to develop and extend the gustatory enjoyment. Sucking actions are often involved, and among the several *reflex* actions excited by very sweet substances is a frequent strong pressure of the anterior dorsal surface of the tongue against the front of the palate. In these various movements the muscular pressure exerted by the tongue is *many times greater* than that required either for the successive liftings of portions of food into position between the cheek teeth or for moving food from one part of the mouth to the other. Here we have a kind of "tongue mastication" (*vide* Mr. J. G. Turner) which, while admittedly falling within the limits of normal function when performed occasionally, becomes *abnormal* or perverted when exercised frequently and to the extent of in large part supplanting normal mastication by the cheek teeth.

4. In some children—more usually of the "vigorous mouth and hearty eater" type—the reduction of *tough* morsels is to an abnormal extent effected *by the anterior teeth* instead of by the cheek teeth, which latter teeth may either be absent or crippled by caries, or, if present, they are thrown out of effective shearing alignment by a malocclusion already established. In this type the cutting edges of the anterior teeth are found to be more worn—and to an undue or abnormal extent—than those of the posterior teeth. Later on one may often observe premolars and molars that have been fully erupted for several years and yet show not a trace of intermaxillary attrition or of food abrasion. Now, when for any reason fine (or moderately fine) reduction of tough food is attempted by the incisors alone, the tongue has to exert considerable upward and *forward* pressure in order to *hold the small morsels in proper position* for each successive shearing stroke (Fig. 1.) This work of reduction (which by the arithmetical increase of the divided fragments must constitute by far the greater part of the total masticating effort) is effected normally by the multi-bladed cheek teeth, in which the rows of lingual cusps automatically, as it were, hold and support the fragments in position, and without calling for more than the very lightest use or pressure of the tongue.[1]

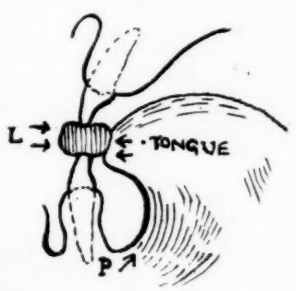


FIG. 1.—Strong forward pressure of the tongue is always exerted when *small* tough morsels are reduced by the incisors, and is required in order to *hold the morsels in proper position* for shearing. Externally the small morsel is held by the lips, as indicated at **L**. This action may become abnormal in frequency when the cheek teeth are lost, or crippled by caries, &c. It *always* involves an upward and backward pull upon the inner surface of the mandible, as at **P**.

Some Predominant Features in Malocclusion.

The bearing of the above-mentioned perverted activities of the tongue upon jaw deformities may here be best brought out by a short consideration of certain features that are often found associated in various classes of malocclusion.

[1] "Mechanism of Mastication in Man." Trans. Sixth Internat. Dental Congress, p. 63 et seq. "Form and Function of Teeth," Journ. Anat. vol. lii., October, 1917.

Twenty years ago (1899) the adjourned discussion of a paper on "The Treatment of Superior Protrusion," read by Mr. J. F. Colyer at the Odontological Society of Great Britain, included a full and interesting contribution from Mr. E. Lloyd-Williams on the ætiology of that deformity. In the discussion following—deservedly a "classic" upon the particular subject—all the known explanations were in turn advanced, excepting perhaps only the ductless gland theory and the antenatal and parturition theories. Yet, as one of the speakers very moderately expressed it, "there was still something missing in all the hints which had been thrown out with regard to causation."

There was general agreement upon the points mentioned by Mr. W. Hern and Mr. Lloyd-Williams as to the

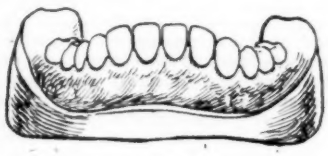


FIG. 2.—High level of incisors, without "crowding" of crowns.

following three or four abnormalities found associated in the majority of superior protrusion cases: (1) The high level attained by the alveolar anterior border of the mandible; (2) shortening of the body of the mandible; (3) the increased depth or low level of the premolar and molar region in both maxilla and mandible; (4) some narrowing of the arches; (5) a backward "bite" of all, or nearly all, the mandibular teeth. (Figs. 2, 3, and 4.)

Significance of the Abnormal Vertical Overlap.

The high level or uprising of the incisive border of the mandible involves, ipso facto (excepting only in cases of "open bite") an abnormal degree of vertical overlap in the occlusal relationship of the incisors, the opposed incisors quite often overlapping one another to the full length of their crowns—that is, from two to three times more than the normal amount. Now it is a remarkable and perhaps hardly recognised fact that if and when—from whatever cause—this excessive overlap is in any particular case once established, the several other abnormalities set out above must then of mechanical necessity be concomitant, if not

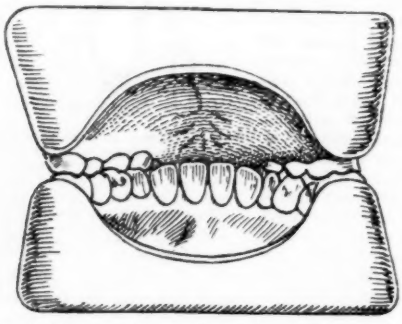


FIG. 4.—The excessive anterior overlap, seen from behind.

actually consequent, features. This statement requires qualifying in regard to the fourth abnormal feature, inasmuch as the arch in some cases does not undergo a *general* narrowing. But excessive overlap must in most cases involve a narrowing of, at any rate, the anterior portion of the mandibular arch, because the lower anterior teeth are shifted to a smaller "circle" (shorter tract) within or behind the lingual walls of the upper ones; the only two alternatives possible being a broadening (anteriorly) of the upper arch, or an excessive retrusion of the lower one. Excessive overlap is a feature of many cases other than those of superior protrusion, and the search for its origin—as probably the master-key to the causal explanation of many jaw deformities—has always made a fascinating appeal to the writer.

Perverted Activity of the Tongue Produces Deforming Strains in the Tooth-bearing Tissues.

The diagram in Fig. 5 shows the position of the tongue and the muscles *chiefly* concerned in its upward and forward thrust, a kind of activity that in many young children has been observed, as above stated, to constitute an abnormally large share of the total effort expended in the oral preparation of food. The tongue is drawn forward and pressed against the lingual walls of the upper anterior teeth and anterior surface of the palate chiefly or almost entirely by

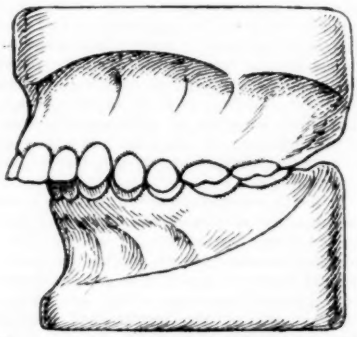


FIG. 3.—"Superior protrusion," with the several other abnormalities that are nearly always found associated with that deformity.

the contraction of the geniohyoglossal muscle. Although theoretical consideration of the normal anatomy and physiology of the parts might bar out any dispute upon that point, it may be well to mention in addition the following demonstrable evidence: 1. Subjective experiments by the writer and some others in whom the lower premolars were missing. By inserting a hooked finger at the angle of the mouth the strong contraction of the genioglossal muscle could be distinctly felt whenever the tongue was thrust upward and forward as described. 2. Experiments upon two subjects in whom the symphyseal portion of the mandible had been removed, and as a consequence the tongue (sound and about normal in size) could not be protruded beyond the lips, and even when the tongue was kept inside the mouth no *forward* pressure could be exerted with it.

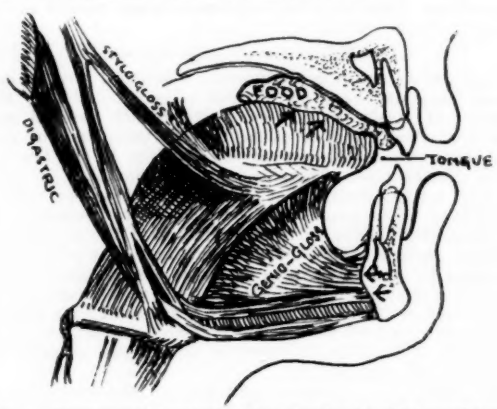


FIG. 5.—Diagrammatic vertical section, showing the chief muscles contracted or called into play during the tongue's perverted activity in food "mashing," sucking, &c., and by the reflex pressure incited by sweet (also "sharp," sour, &c.) substances. A backward traction on the mandible takes place and falls upon the frail bony tissues during the "reconstruction" period.

It is clear, then, that by the contraction of the genioglossal muscle the lower jaw is subjected to a backward pull at and about the region of the genial tubercles, which backward traction is abnormal just in proportion as the forward thrust of the tongue is abnormal in force and frequency of action. This backward pull is in daily operation during the four or five years' reign of the deciduous dentition, and, in addition, throughout the period of change to the permanent dentition. During most of that time the horizontal U-shaped cortical tube of a child's mandible is a

frail box almost "cram full" of teeth. Moreover, the strut-and-stay system of trabeculæ, the tooth crypts, and to some extent even the cortical bone of the main beam, are undergoing a constant process of breaking down and reconstruction; the alveoli, too, are in turn "swept away"—as Sir C. S. Tomes describes it—and rebuilt. Even in the completed jaw bone of the adult the long-continued action of abnormal stresses brings about bending and shearing strains that in time appear as obvious deformities; the striking deformity observed (in the horizontal branch of the mandible) in some cases of ankylosis has been attributed by Dr. M. H. Cryer to the abnormal action of the *depressor* muscles, the power of which is, nevertheless, thought to be fractionally small compared with that of the elevator muscles. The more readily, then, will one admit that during the growing and reconstruction period the reaction of the mandible to abnormal stresses may take effect both in inhibiting and disorganising growth and producing durable strains (deforming changes of shape) whenever the stresses exceed certain limits of force and time (or frequency) of action. These limits are known to be low for young children; in the routine practice of orthodontics they are purposely overpassed by the artificial application of very small forces.

I have estimated quantitatively the force of the tongue's upward and forward thrust, and although my measuring apparatus is too crude and imperfect to warrant presenting figures, I am quite satisfied that this force is many times greater in amount than that effectively used by dentists to move teeth and alveoli—often, too, in the permanent dentition.

Those who regard with some doubt the various explanations that the mandibular retrusion is due to "want of development," "heredity," "small tongue," and other suggested factors that are ill-defined and mostly negative, will be glad to turn to the consideration of a positive factor that can be *seen in action*, that acts in the precise direction required to produce the observed phenomena, and the more hidden results of which in changing the normal disposition of the bony tissues can be further investigated by X ray examination and also in the dissecting room. In some cases it may be that the backward or centripetal pull of the genioglossal and "sublingual" muscles produces retrusion of the mandible solely or mainly by *inhibiting or restraining its development*. But to deny or exclude the possibility of actual deforming *strains* (that is, slow yielding of the bony tissues) occurring, would be to make a unique exception of a particular part of the jaw and to endow it with an unknown super-resistant quality. And if growth-inhibition or yielding from backward traction *did* in point of fact occur, the resulting deformities would be exactly like those that confront us daily and with increasing frequency, and that, in this country alone, must affect many thousands of children in whom the handicapping disorder will not be treated or ever right itself.

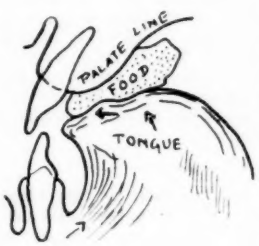


FIG. 6.—To illustrate, in simpler diagram, the conditions detailed in Fig. 5.

I turn now to the *excessive overlap* or (what is practically the same thing) abnormally high level of the incisive border of the mandible. The majority of observers are agreed that the causes of this very common deformity, by no means confined to superior protrusion cases, "remain shrouded in sphynx-like mystery." Explanations such as "pressure of the lower lip," "eruptive pressure of the canines" have been somewhat waveringly offered, and in application to but a few cases only; the explanation I here advance applies to a wide range of cases, possibly to nearly all cases of excessive overlap.

The diagrams, Figs. 1, 5, and 6, help to show that the part of the tongue whereat (during eating, sucking, &c.) pressure is applied against the palate and anterior upper teeth lies at a *higher level* than the bony area of attachment of the genioglossal muscle. Therefore in the resistant pull of this muscle upon the tongue there must be a *downward* as well as a backward component, the general substance of the tongue being at the same time stiffened to a quasi-rigidity by a number of other muscles, the coördinated actions of which it is needless at present to attempt to analyse. When holding the raised tongue against the resistance offered on or at the anterior maxillary surfaces, the genioglossal fibres are perforce inclined markedly upward, so that (reaction being equal and opposite) their contraction must exert an obliquely *upward* and backward pull upon their place of origin on the mandible. The existence and the strength of this upward pull can be felt and realised when (under the conditions described), with an inserted finger, an

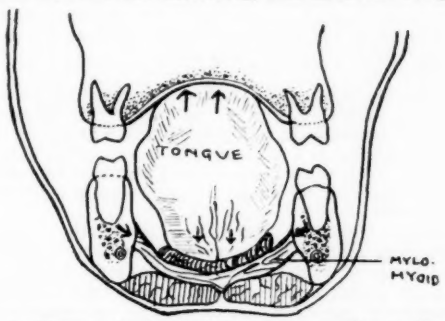


FIG. 7.—Diagram showing that the resistive reaction to the upward thrust of the muscle-stiffened tongue must involve a downward pressure upon the mylohyoid, thus causing a downward and (narrowing) centripetal pull upon the inner surfaces of the mandible.

attempt is made to press or keep the converging anterior part of the muscle down. Under this upward tensional stress the *young* "*unready*" *bone is strained* and very slowly and gradually *yields in an upward direction*. The force of the pull is distributed on and about just that very region where the apices of the milk anterior teeth and the crypts of the permanent ones lie, so that it would undoubtedly tend to produce the unexplained variety of phenomena found associated with uprising of the alveolar border—"apical crowding" and anterior "crowding" with or without spacing of the crowns, the "fan" arrangement, and the (hitherto) completely puzzling type mentioned by Sir Harry Baldwin, wherein the lower incisors "were jumbled together into two lines."

And the "low level" of the mandibular post-canine teeth is a further and almost inevitable consequence ensuing from the downward component of the tongue's pressure upon the diaphragmatic floor of the mouth, whereon the base of the muscle-stiffened tongue finds the necessary resistance to its own upward thrust. The digastric and geniohyoid muscles play a considerable part in supporting the upward thrusting tongue, but certainly the mylohyoid "slings" upon which the tongue is seated must exert a downward pull upon those inner surfaces of the mandible from which they are hung. (Fig. 7.) Experimental trial (subjective and objective) readily shows that in reaction to the tongue's upward thrust the downward bulge of the oral floor is both seen and felt to be lowest or most prominent in the region of the lower premolars and first molars, where, as it happens, the "low level" of the alveolar border or teeth is found to be the most marked. It is worth noting, too, in view of the downward traction internally, that the mandibular cheek teeth often have an abnormally inward tilt.

The pull of the mylohyoid (under the tongue's perverted activity) will of course vary in strength and *direction* with the individual, and with the varying proportional development of the different tissues, including the tongue itself. So that when the tongue is (constitutionally?) small and narrow, the supporting mylohyoid sheet may attain a more nearly horizontal plane and its pull will then be the more directly *inward*, tending to draw the two sides of the mandible together. Thus if a tongue small or subnormal in volume is found associated with a narrow arch, the usual explanation that the small tongue (negatively or by its passivity) causes the narrow arch may be wrong, and is based too much upon assumption. The significance, if any, of the association can be more instructively interpreted by taking into account the more horizontal direction of the

contractile pull of the mylohyoid upon the mandible. A large tongue will, on the other hand, the more deeply bulge into and fill the oral floor-space, partly overcoming the resistance of the mylohyoid sheet and causing its pull upon the mandible to be more downward and less inward. In regard to the inward traction the following observation may be significant.

During the routine examination of many thousands of occluded plaster casts, I observed that in a proportion of those in which the occlusion of molars might be reckoned as good mesio-distally the occlusion bucco-lingually would have been better or more normal if the mandibular molars were moved buccally or wider apart—that is to say, the mandibular arch was a little too narrow at the first molars for the normal occlusion of these teeth with their maxillary opponents. This in itself suggests the possibility that in some cases the *lower jaw leads the way* in the contraction of both arches.

In conclusion, it is urged that what I have called (in short phrase) "perverted activity of the tongue" is harmfully frequent among children, and is incited chiefly in the oral manipulation of foods a *preponderant* amount of which is of a sweet, soft, or glutinous nature; and also less frequently by the crippling or (from whatever reason) insufficient use of the cheek teeth.

At the same time it is possible to go to the other extreme by encouraging young children to masticate well an unduly large proportion of tough food, so that the anterior teeth are to an undue extent called upon to relieve the overworked cheek teeth in the extra labour of fine reduction; the forward-thrusting and holding action of the tongue is thus brought into too frequent use, and the mandible is subjected to an upward and backward traction. In several reported cases (including children of dentists) where the precepts of vigorous mastication were faithfully and conscientiously put into practice, the deciduous arches were seen to be broad and fine, and the teeth individually were in every way satisfactory; nevertheless, the puzzling excessive overlap was there, as well as some degree of post-normal occlusion.

That the forward thrust of the tongue during its perverted activity must, in some cases, induce protrusion of the *upper* teeth is so evident a proposition that I omitted any explicit statement on the point, and detailed discussion is here barred out from want of space. But what I regard as remarkable and important in my discovery (about five years ago) of the tongue's abnormal activity, is its unsuspected yet inevitable reaction on the mandible. The tongue exerts a *centrifugal pressure on the maxilla* anteriorly, and the main resistance and reaction to the tongue's thrust takes effect as a *centripetal traction on the mandible*, the one being in effect the reciprocal of the other.

The great majority of superior protrusion cases are associated with inferior retrusion, as stated by Mr. Norman G. Bennett when reporting (March, 1912) to the British Society for the Study of Orthodontics, for the Committee on Orthodontic Classification. The degree of superior protrusion actually produced during functional activity must depend upon the greater or less amount of counteracting restraint and inward pressure from the upper lip, which effective centripetal pressure varies, I think, not so much or so entirely with the length, thickness, or "poise" of the lip as with the "temperamental" and muscular *motility* in the particular individual. This line of investigation may seem too obscure to bring out anything helpful, but in point of fact striking differences in the functional labial movements of different individuals are made evident merely by visual observation. More important, however, and more directly bearing upon my present thesis concerning the identification of primary causes and the actions they evoke, is the marked influence of *reflex* movement and pressure, here just touched upon as follows:—

Gustatory Reflexes.

Among the oral *reflexes* incited by sweetened food and sweet substances, as well as substances with an acid or a "sharp" taste, there are certain labial and buccal muscular actions which very probably play a part in the contraction of the upper arch. Discussion of this would be quite relevant, but must be deferred.

I propose in a future communication to show that perverted activity of the tongue may also bear a causal relationship to two other deformities of the jaw—namely, (1) inferior protrusion or "underhung" bite; and (2) open bite.

I.—THE ANTISCORBUTIC AND GROWTH-PROMOTING VALUE OF CANNED VEGETABLES.

BY MABEL E. D. CAMPBELL AND HARRIETTE CHICK.

(*From the Lister Institute, Department of Experimental Pathology.*)

THE experimental work described below was undertaken in August, 1918, at the request of the Controller of Horticulture, Food Production Department, and Miss Campbell, of that department, was detailed to work upon this problem at the Lister Institute. It forms one of a series of researches on experimental scurvy carried out at this Institute. The aim was to ascertain what changes take place in the nutritive value of vegetables during the process of canning, with special reference to vitamine-content.

It was to be presumed, from the information already available as to the destructive effect of heat upon the anti-scorbutic factor in cabbage leaves (Delf, 1918), that canned vegetables would suffer considerable deterioration in anti-scorbutic value owing to the high temperature to which they are exposed in the process of preparation. The present work was directed to obtaining an accurate estimate of what that loss might be. Cabbage and green (runner) bean pods were selected as suitable vegetables for the experiment. Cabbage was chosen because many data as to its antiscorbutic value, both in the raw and cooked condition, were already available from the researches of Dr. Marion Delf (1918) at the Lister Institute; green runner beans because they are a good example of a vegetable frequently chosen by the public for preservation by canning.

The experiments consisted essentially in estimating and comparing the minimal amounts of these vegetables—(*a*) when raw, and (*b*) after canning—which must be added daily to a basal scurvy-producing diet in order to protect young guinea-pigs from scurvy over a period of three months. These results are set out in the accompanying table, in which data obtained with other foodstuffs are included for purposes of comparison.

Method of Experiment.

The method of experiment was the same as that adopted generally in the series of researches on experimental scurvy published from this Institute.[3—10] It is based on that employed by Holst and Fröhlich,[1 2] who chose the guinea-pig as experimental animal and grain of various kinds with water as the basal "scurvy diet." On such a diet young guinea-pigs are found to sicken and die of scurvy in from three to four weeks with great loss of weight.

In a study of the antiscurvy value of foodstuffs the aim is to devise a diet which shall afford abundance of all necessary factors except the antiscorbutic factor. This basal diet must contain suitable proportions of (*a*) carbohydrate and (*b*) fat, the right kind and amount of (*c*) mineral salts and (*d*) protein, and in addition an adequate quantity of the two so-called growth accessory factors described by McCollum and his co-workers as (*e*) "fat-soluble" growth factor and (*f*) "water-soluble" or antineuritic (antiberi-beri) factor. In the diet of oats, bran and water which we have employed in many cases (*a*), (*b*), and (*f*) are provided in sufficient quantity and probably in the mixture of the two grains, oats and wheat (*c*) and (*d*), are also adequate for the nutrition of the guinea-pig. The diet is, however, deficient in both the anti-scurvy factor and the "fat-soluble" growth factor. It has therefore been our practice in many experiments to supply the latter by means of a daily ration (60 c.cm.) of milk heated for one hour to 120° C. to destroy its original antiscorbutic properties. This addition also affords an extra supply of protein of a highly nutritious character, and upon this "scurvy diet" the animals grow well until loss of weight sets in with the occurrence of scurvy symptoms. Death from scurvy occurs in from four to six weeks.

By addition to the basal diet of various weighed daily rations of (*a*) raw beans and canned beans, (*b*) raw cabbage and canned cabbage, the minimal amounts required to protect from scurvy were estimated. On comparison of these values the degree of destruction experienced by the anti-scorbutic factor during the process of canning and storage could be approximately determined.

* Weighed amounts of the vegetables (cut into small pieces) were offered to the animals daily. Usually the ration was consumed greedily, but any residue noted on the next day was weighed (after soaking in water) and the amount deducted from the original weight given. If a residue was found on several succeeding days the animal was rejected, as hand-feeding of soft vegetables is too laborious and inaccurate a procedure. While animals were developing scurvy, hand-feeding of milk with a glass syringe was frequently resorted to in order to maintain an average consumption of 60 c.cm. daily.

namely, 2–3 months. All canned samples were drained and turned out into a dish immediately on opening the can. The residue not used for the day's ration was kept in cold store. It was rarely used later than two days after opening.

Cabbage—(1) *Antiscorbutic value.*—In this case the experiments were arranged to test the canned material as fresh as possible; it was never more than three weeks old, and the average age was two weeks. Previous results obtained by Dr. Marion Delf (1918) showed that 1·5 g. of raw cabbage added to a diet of oats, bran and autoclaved milk sufficed to prevent scurvy in young guinea-pigs, but that

Diet. Special ration.	Amount (grams).	Basal.	No. of animals.	Length of experiment.	Result as regards— Growth.	Result as regards— Occurrence of Scurvy.	Observer.
				Days.			
Cabbage leaves—							
(1) Raw	5·0	Oats, bran, autoclaved milk.	3	90	Good.	Protection.	Delf, 1918.
	2·5		5	90	Fair.	,,	,,
	1·5		6	70–90	,,	,,	,,
	0·5		4	67–90	Very little.	Scurvy, but some degree of protection.	,,
(2) Cooked in steam—							
(*a*) 60 min. 90° C.	5·0		4	21–50	,,	Severe scurvy.	,,
(*b*) 20 min. 100° C.	5·0		4	90	Fair.	Protection almost complete.	,,
(3) Canned—60 min. 90–100° C.	7·5		3	90–95	Very good.	Protection.	Campbell and Chick.
,, ,,	5·0		3	33–90	Good in 2 cases.	Scurvy, but some degree of protection in 2 cases.	,, ,,
(4) Raw	15·0	Oats, bran, water.	4	90	Very good.	Protection.	Delf, 1918.
(5) Cooked in steam—							
60 min. 100° C.	15·0		3	90	,,	,,	,,
(6) Canned—60 min. 90–100° C.	15·0		3	68–93	Very poor.	,,	Campbell and Chick.
,, ,,	15·0	+ 20 c.cm. liquor from cans.	3	90	Fair.	,,	,, ,,
Runner beans—							
(1) Raw	5·0	Oats, bran, autoclaved milk.	3	84–91	Good.	,,	,, ,,
	2·5		3	59–64	Very little.	Scurvy.	,, ,,
	1·5		4	48–61	,,	,,	,, ,,
(2) Canned—140 min. 100° C.	20·0		3	28–40	,,	,,	,, ,,
	10·0		1	28	None.	,,	,, ,,
Carrot juice. Raw.	20·0	,,	3	75–95	Fair.	Protection.	Chick and Rhodes, 1918.
Swede ,, ,,	2·5		4	90–100	Good.	,,	,, ,,
Lemon ,, ,,	1·5		4	90	,,	,,	Chick, Hume, Skelton and Smith, 1918, and unpublished experiments.
Fresh milk	100–150	Oats, bran, water.	2	90–113	,,	,,	Chick, Hume and Skelton, 1918, I., and unpublished experiments.
Germinating peas	5·0	Oats, bran, autoclaved milk.	5	87–97	,,	,,	Chick and Delf, 1919.
Dried cabbage*	5·0	Oats, bran, water.	6	66–134	None.	Protection in some cases.	Delf and Skelton, 1918.

* Equivalent to 50 g. fresh cabbage.

Methods Employed in Canning.

Cabbage.—The methods used were those advocated by the Food Production Department in their pamphlet No. 34. Fresh green outer leaves were chosen. These were washed in cold water, blanched, and cold-dipped (i.e., exposed to boiling water containing a little sodium bicarbonate for 3 minutes, then plunged into cold water), and packed into lacquered cans. These were filled with boiling water to within ¼ inch of the top, and at once hermetically sealed by soldering the lids. Sterilisation was effected by exposure of the cans to steam at 100° C. for 1½ hours in a closed boiler. After cooling by plunging into cold water the cans were stored at laboratory temperature (60–65° F.). Experiments with control tins in which the lids were replaced by corks carrying thermometers showed that this process of canning involved the exposure of the cabbage in the cans to a temperature of 90–100° C. for 1 hour. The average proportion of cabbage to water in the cans was found to be 1·6 to 1·0 by weight and the water content of the drained cabbage as fed to the animals, 90–92 per cent., was approximately the same as that of fresh cabbage. The approximate mean age when tested was two weeks after canning.

Beans.—Young crisp runner bean pods were selected where possible. The method in outline resembled that used with cabbage, with the difference that the blanching lasted 4 minutes, and the sterilising was done intermittently—i.e., for 1½ hours on one day and 1 hour on the succeeding day. Control experiments showed that the contents of the cans were exposed to a temperature of 100° C. for a total period of approximately 2 hours 20 minutes. The proportion of beans to water was approximately 1·7 to 1·0, and the water content of the canned samples 94–96 per cent. The time of storage at laboratory temperature before testing of the canned beans was longer than was the case with the canned cabbage, 0·5 g. daily was insufficient for that purpose. With 7·5 g. daily of canned cabbage growth was well maintained in three animals, and there were no symptoms of scurvy during life or post mortem. With a 5 g. ration daily, good health was enjoyed by two animals out of three, but in these cases distinct signs of scurvy were shown by soreness of the limbs and characteristic hæmorrhages post mortem. The third animal developed severe scurvy during life and showed the usual signs at post-mortem examination. Although these animals showed good health in two cases out of three the degree of protection from scurvy was less than that enjoyed upon a 1·5 g. ration of raw cabbage; it was, however, distinctly greater than upon a 0·5 g. ration. *The loss of antiscurvy value during canning would, therefore, appear to be about 70 per cent.—i.e., an antiscurvy value of 5 g. raw cabbage was reduced to that of about 1·5 g. raw cabbage.*

(2) *Growth-promoting value.*—In a further set of experiments an attempt was made to trace the fate during canning of the growth-promoting "fat-soluble" accessory factor known to be present in green leaves (McCollum, Simmonds, and Pitz, 1916). The ration was much increased—viz., to 15 g. daily—and autoclaved milk, which provided the "fat soluble" growth factor in the preceding experiments, was omitted from the dietary, which consisted therefore of oats and bran alone. Delf (loc. cit.) has shown that a diet of oats and bran and 15 g. of raw cabbage is sufficient to promote good growth and provide ample protection from scurvy. This ration of fresh green leaves provides a large excess of the antiscorbutic factor, and is evidently also large enough to afford the necessary fat-soluble growth factor and to supplement any defect in the nature of the proteins in oats and bran, if such exists. After heating in steam for 1–2 hours at 100° C., Delf found the same ration, 15 g., adequate for

the purpose; the animals were maintained in good health, and in one case healthy young were born.

In the case of canned cabbage, also employing a 15 g. ration, the result was otherwise. Scurvy was certainly prevented, but the animals showed little or no growth during the three months of the experiment. In the case of one animal autoclaved milk was provided from the sixty-fourth day, and growth immediately began. This result suggests that during heating and storing in water the growth-promoting vitamine originally present in the green leaves was either (1) destroyed to a large extent, or (2) had escaped into the water in which they had been immersed (the proportion of cabbage to water by weight in the cans was approximately 3 : 2). A series of further experiments was made in which the water in the tins was fed to the animals, together with the canned cabbage; much better growth was obtained, a result which seems to support the second view.

In the experiments described in the preceding section with smaller rations of canned cabbage, 5 to 7·5 g., the "fat-soluble" growth-promoting factor was provided in the ration of autoclaved milk.

Beans.—Antiscorbutic value.—There are no quantitative data available as to the antiscorbutic value of the raw runner bean pods in comparison with other vegetables. Special experiments had therefore to be made in order to determine the minimum amount which must be fed daily to guinea-pigs on a scurvy diet in order to prevent onset of the disease. They showed that a 5 g. ration may be taken as the minimum amount giving protection from scurvy. With 2·5 g. and less all animals developed the disease, and with 5 g. and over all escaped. After canning, however, a daily ration of 20 g. was found inadequate, and severe scurvy was developed in every case. *By the process of canning, therefore, the anti-scurvy value of 20 g. raw bean pods was reduced to less than that of 5 g., and was not superior to 1·5 or 2·5 g. raw bean pods—in other words, 75 per cent. to 90 per cent. had been destroyed.*

Conclusion.

1. In the process of canning vegetables the greater part of the original antiscurvy value of the raw vegetable is destroyed. In the case of runner bean pods the loss is estimated at about 90 per cent. of the original value; in the case of cabbage at about 70 per cent. of the original value. The process of canning cabbage included heating in water for about one hour at 90° to 100° C., and for beans the process was repeated on the day following.

2. This loss is primarily due to the destruction of anti-scurvy material occurring during the heating involved in the process of canning. A further loss may be expected to take place during the period of storage. The canned cabbage was examined two weeks after preparation and the canned beans three months after.

3. In the case of green-leaf vegetables which possess, in addition to the antiscurvy vitamine, the "fat-soluble" growth-promoting accessory factor, the latter substance is also lacking in the canned material unless the liquor be also taken.

4. *The value of canned vegetables as regard antiscurvy and growth-promoting properties must be regarded as negligible.*

References.—1. Holst and Fröhlich (1907): Journal of Hygiene, vol. vii., p. 619. 2. Holst and Fröhlich (1912): Zeitschrift f. Hygiene, vol. lxxii., p. 1. 3. Chick and Hume (1917): Trans. Soc. Trop. Med. and Hygiene, vol. x., p. 141. 4. Chick, Hume, and Skelton (1918): Biochemical Journal, vol. xii., p. 131; and (5) THE LANCET, Jan. 5th. 6. Chick, Hume, Skelton, and Smith (1918): THE LANCET, Nov. 30th. 7. Chick and Delf (1919): Biochem. Journal, vol. xiii., p. 199. 8. Chick and Rhodes (1918); THE LANCET, Dec. 7th. 9. Delf (1918): Biochemical Journal, vol. xii., p. 416. 10. Delf and Skelton (1918): Biochemical Journal, vol. xii., p. 448. 11. McCollum, Simmonds, and Pitz (1916): Amer. Jour. Phys., xli., p. 361.

II.—THE ANTISCORBUTIC VALUE OF SOME INDIAN DRIED FRUITS:

(*a*) TAMARIND, (*b*) COCUM, AND (*c*) MANGO ("AMCHUR").

BY HARRIETTE CHICK, E. MARGARET HUME, AND RUTH F. SKELTON.

(*From the Lister Institute, Department of Experimental Pathology.*)

THE experimental investigation of these dried fruits was undertaken early in 1917, at a period in the war when scurvy was still proving a serious menace to our native troops in Asia. These and similar materials have long been esteemed as antiscorbutics by the native population of India, and instances are to be found in the literature and elsewhere in which the prevention and cure of human scurvy has been attributed to their agency. For example, MacNab[1] (1837) relates how an outbreak of Scurvy at Nassirabad, Rajputana, in 1833–34 was treated with good results by an infusion made from "anola," the dried fruits of *Phyllanthus emblica*. This product was commonly bought and sold in the native bazaars and considered to possess great anti-scorbutic virtue. The dose taken amounted to ½ oz. (14 g.) daily, calculated on the original dry material.

Major-General Sir Havelock Charles,[2] who was attached as medical officer to the Afghan Boundary Commission in 1884–86, ascribes the freedom from scurvy of the native troops accompanying this expedition to the regular consumption of "amchur," or dried mango, whenever fresh fruits or vegetables were unavailable. It was at his suggestion that we undertook the following experimental study, and the samples of tamarind, cocum, and amchur investigated were obtained from India with his assistance. Of these, the two first-named are commonly included in the native soldiers' ration.

The method adopted for studying the antiscorbutic value of these fruits was as follows. Guinea-pigs were used as experimental animals, following in principle the methods employed by Holst and Fröhlich[3] as modified by Chick and Hume.[4] If greenstuff is removed from their normal diet of grain and green leaves these animals sicken and die of scurvy in 3–6 weeks. In the present experiments the basal "scurvy" diet consisted of oats and bran *ad libitum*, together with a daily ration of 60 c.cm. of milk, heated to 120° C., for one hour to destroy its original antiscorbutic value. This diet is satisfactory for the nourishment of these animals in every respect save only that it lacks the anti-scorbutic vitamine. Good growth is made until the onset of scurvy. The antiscorbutic value of any foodstuff is determined by observing the effect of adding measured daily rations to the basal diet and estimating the average minimum daily addition necessary to prevent scurvy.

Antiscorbutic Value of Dried Tamarind, Cocum and Amchur, compared with other Fruits and Vegetables in the Fresh Condition, based on Experimental Work with Guinea-pigs.

Basal diet: Oats and bran ad libitum; autoclaved milk, 60 c.cm. daily.

Antiscorbutic material.	Dose.	No. of animals.	Time of experiment.	Result.
			days.	
None.	—	4	34–40	Death from scurvy in 4–6 weeks.
Tamarind	3·5 g.	4	60–92	Scurvy, but some protection, life prolonged.
Cocum.	4 g.	4	38–91	Scurvy, but some protection, life prolonged in some cases.
"Amchur."	4·5 g.	4	50–71	Scurvy, but some protection.
Fresh meat juice, raw.	20 c.cm	4	29–66	Scurvy, slight protection in some cases, life prolonged to 9 weeks in 1 case.
Beetroot juice, raw.	20 c.cm.	2	67–88	Scurvy, slight protection only.
* Carrot juice, raw.	20 c.cm	4	58–95	Protection from scurvy.
* Swede ,,	2·5c.cm.	4	90–100	
* Cabbage leaves.	1·5 g.	6	70–90	
* Germinated peas.	5 g.	5	87–97	
* Green bean-pods (scarlet runner).	5 g.	3	84–91	
* Fresh lemon juice.	1·5c.cm.	4	90	
*† Fresh lime juice.	10 c.cm.	2	61–90	
* Potato, cooked.	20 c.cm.	3	73–92	

* Minimum doses required for prevention of scurvy.
† Sour lime, West Indian.

The investigation of these dried fruits presented great technical difficulty, as the animals could not be induced to eat them in the dry condition. It was necessary to make decoctions by soaking in water and squeezing the pulp through muslin and hand-feeding the thick liquor obtained to the animals by means of a syringe. Even so it was distasteful, and there was a limit to the amount that could be tolerated. The daily doses shown in the accompanying table, 3 to 5 g., are calculated in terms of the original dry material, and represent the largest amounts it was found possible to administer.

With these doses there was evidence of a small but distinct protective action. This action was not complete, and scurvy occurred invariably, but a fair measure of health and growth was apparent, and in some cases life was prolonged for as long as three months. Animals surviving this period were killed by chloroform and post-mortem examinations were made.

In absence of any addition to the "scurvy" diet, death from severe scurvy took place in 30–40 days, and there is little doubt that had it been possible to administer larger amounts a more complete protection from scurvy would have been obtained.

In the accompanying table are given also the minimum amounts of other foodstuffs required to prevent scurvy under similar conditions for purposes of comparison. It will be seen that the value of these dried fruits is much inferior to that of many vegetables and fruits (cabbages, swedes, germinated pulses, oranges, lemons); is equal or superior to others (carrots, beetroot), and to meat juice.

Conclusion.

Dry tamarind, cocum, and mango possess a definite but small antiscorbutic value. This value is greatly inferior to that of raw cabbages, swedes, germinated pulses, orange juice, lemon juice, but equal or superior to that of carrots, beetroots, cooked potatoes, raw meat juice, reckoned weight for weight in the natural condition.

Bibliography.—1. **MacNab**: Quart. Journ. Calcutta Medical and Physical Society, 1837, vol. i. 2. Afghan Boundary Commission Report, 1884–1886. 3. Holst and Fröhlich: Zeitschrift für Hygiene, 1912, vol. lxxii., p. 1. 4. Chick and Hume: Trans. Soc. Trop. Med. and Hyg., 1917, vol. x.

III.—A COMPARISON BETWEEN THE ANTISCORBUTIC PROPERTIES OF FRESH, HEATED, AND DRIED COW'S MILK.

BY ROSAMUND E. BARNES AND E. MARGARET HUME.

(From the Lister Institute, Department of Experimental Pathology.)

IN previous communications, one of us (E. M. H.), in conjunction with Chick and Skelton (1918, I. and II.), has shown that raw cow's milk must be classed among the less valuable foodstuffs as regards its antiscorbutic properties. Whereas in the case of many raw fruits and vegetables, amounts varying from 1·5 to 10 g. daily will prevent scurvy in guinea-pigs upon a diet otherwise devoid of antiscorbutic material, 100 to 150 c.cm. of raw cow's milk is required. The present work, which will shortly be published in greater detail in the *Biochemical Journal*, consists of an attempt to make a direct comparison between the antiscorbutic value of dried and raw milk, in order to ascertain to what extent, if any, the former is inferior.

Inferiority of Dried Milk.

Two series of experiments were made, one series with guinea-pigs and the second with monkeys, young growing animals being selected in both instances. In each series the same result was obtained, showing the marked inferiority of the dried milk for the prevention of scurvy. The dried milk used was a well-known commercial brand manufactured by the Just Hatmaker process. Two sets of samples were tested: Sample A was delivered regularly immediately after manufacture and was less than three weeks old when used for experiment; Sample B was 6 to 12 months old when tested. The fresh milk used for comparison was very pure, specially delivered, country milk, obtained from a model dairy. The methods adopted in the experiments were the same as those previously described by Chick, Hume, and Skelton (1918, II.).

The results obtained with raw milk confirm those of the earlier work, 100 to 150 c.cm. daily being found necessary to prevent scurvy in animals of 300 to 500 g. weight. In case of the dried milk these amounts proved inadequate, and every animal developed the disease after periods of time varying from 20 to 30 days. These experiments with guinea-pigs are extremely difficult to carry out, as comparatively few animals of this size are able to tolerate these large amounts of fluid without digestive disturbance. For this reason the animals receiving dried milk were at an advantage, because it could be given in a concentration greater than that of ordinary milk and the quantity of fluid taken could thus be lessened. The results of these experiments are summarised in the table (A).

The monkeys used in the second series of experiments were a varied collection. In all 8 animals were used, including the following genera: macacus, 2 species; cercopithecus, 2 species; cercocebus, 1 species, of weight varying from 2 to 3 kilogrammes. The results are summarised in the table (B) and completely confirm those obtained with guinea-pigs. In case of raw milk a ration of 125 to 175 c.cm. daily was found adequate to maintain health and to prevent scurvy; but with dried milk severe scurvy was developed on daily amounts equivalent to 200 c.cm. and a ration of about 250 to 300 c.cm. was found necessary for safety. The dried milk used in these experiments was all taken from Sample A, and fed less than three weeks after manufacture.

With animals so few and so various there was danger of drawing erroneous conclusions due to idiosyncrasy of individuals, but this was avoided by observing the effect of fresh and dried milk upon the same animal. Thus monkey No. 6 in the table (B), which acquired severe scurvy on a daily ration of dried milk equivalent to 175 c.cm., was cured completely when a daily average of 175 c.cm. fresh milk was substituted for the dried milk ration. In fact, this animal remained in good health during a long subsequent period, when this amount was cut down to 125 c.cm. daily.

Value of "Scalded" Fresh Milk.

Monkey No. 7 had developed severe scurvy when receiving a daily ration of dried milk equivalent to 200 c.cm., and had shown no improvement, but grew progressively worse when this was increased to 300 c.cm. daily. The milk ration was then changed to 200 c.cm. daily of "scalded" milk—i.e., milk brought rapidly to the boil in a saucepan over a gas-

TABLE SHOWING ANTISCORBUTIC VALUE OF COW'S MILK, FRESH AND DRIED AND HEATED.

(A) Experiments with Guinea-pigs.

(The Diet Consisted Otherwise of 10–20 g. Oats and Bran.)

(1) No. of animals used. (2) Average amount consumed daily (c.cm.). (3) Time of experiment (days).

Description of milk.	(1)	(2)	(3)	Result.
Fresh milk, full cream or separated.	6	113	36–111	Death from scurvy in 1 case. Death from other diseases in 2 cases, one showing slight traces. Scurvy post-mortem. Good health in 3 cases.
Dried milk, full cream, 1–2 weeks after manufacture.	5	108*	25–48	Scurvy in all cases, very severe in 4 cases.
Dried milk, full cream 6–12 months after manufacture.	5	97	33–72	Scurvy in all cases, severe in 4 cases.

(B) Experiments with Monkeys.

(The Diet Consisted Otherwise of Boiled, Polished Rice, Wheat Germ, Pea Nuts, Dried Peas.)

(4) No. of monkey. (5) Average daily ration milk (c.cm.). (6) Time of experiment (days). (7) Time after which onset scurvy observed (days).

—	(4)	Wt. (g.).	(5)	(6)	(7)	Result.
Fresh raw milk.	1	2080	50(maximum)	150	66	Scurvy.
	2	2770	75	143	119	Scurvy, cured with 10 g. daily raw germinated peas.
	3	1940	125	182	—	Good health.
	4	2770	150	184	115†	Inconclusive result.
	5	2230	200	225	—	Good health.
Dried milk, less than 3 weeks after date of manufacture.	6	2080	175	142	105	Severe scurvy; cure obtained with 175 c.cm. fresh milk daily, consolidated on 125 c.cm.
	7	2470	200–300	104	87	Severe scurvy, cured by 200 c.cm. daily of "scalded" raw milk.
	8	2740	250	161	117†	Inconclusive result.

* Average taken up to time of onset of scurvy. † Scurvy symptoms noted, improvement later without alteration of diet, coincident with time of year when cows leave winter stalls for the open pasture.

burner, and then immediately set to cool. This procedure was arranged to imitate, as far as possible, a common household method of boiling milk before feeding to infants, and one that may be relied upon to destroy the tubercle bacillus and other infective disease germs. Measurements of temperature were made, and it was ascertained that during this process the milk was exposed to a temperature between 70° and 100° C. for 1½ minutes during the heating, and 4 minutes during the cooling.

Milk so treated was found to possess an antiscorbutic value much in excess of that possessed by dried milk. A rapid cure was the result of substituting 200 c.cm. of this "scalded" milk for the dried milk ration in case of monkey No. 7. The day after the change was made the animal showed a very slight improvement, and in a week was markedly better; in 16 days he had regained the use of his hind limbs and loss of weight had ceased, and satisfactory growth became established. Two experiments in the table (B) are described as yielding an inconclusive result. In both cases symptoms of scurvy developing on a certain ration of milk, raw in one case and dried in the other, disappeared later without any intentional change in diet. The experiments were started in the winter and scurvy was detected about four months later, in April–May, but soon afterwards the symptoms began to clear up. This we attribute to the change in the cow's diet about this time of year—i.e., from the hay, roots, oil-cake, and cereals of the winter feed to the fresh grass of the open pasture. In consequence of the great increase of antiscorbutic material in the cow's diet, one would expect a corresponding increase in the antiscorbutic value of the milk given.

Summary and Conclusions.

1. The antiscorbutic value of cow's milk, fresh, heated, and dried, was determined by means of quantitative nutritional experiments with guinea-pigs and monkeys. Cow's milk, even when fresh, was found to be a foodstuff comparatively poor in antiscorbutic properties, and large daily rations, 100 to 150 c.cm. daily for guinea-pigs and 125 to 175 c.cm. daily for monkeys, were needed to protect these animals from scurvy, when upon a diet otherwise devoid of antiscorbutic material. Dried milk was found inferior to raw milk in this respect. Even with material of quite recent manufacture we were unable to protect guinea-pigs from scurvy with any amounts that it was found possible to administer. In case of monkeys the minimum protective dose was found to be approximately from 250 to 300 c.cm. daily; in other words, about half the original antiscorbutic value of the fresh milk had been destroyed in the process of drying. "Scalded" milk was found distinctly superior to dried milk.

2. These facts form a strong argument for the desirability of adding an extra antiscorbutic to the diet of infants nourished on dried milk. The most suitable substances for this purpose are raw orange juice, raw swede juice (Chick and Rhodes, 1918), or juice of tomatoes, raw or canned (Hess and Unger, 1919). Grape juice and carrot juice are also useful but less valuable, as, being inferior in potency, correspondingly larger doses are required. Potatoes cooked and mashed can be employed in cases where starchy foods are not considered unsuitable (Hess and Fish, 1914).

3. Some evidence was obtained showing that winter milk is inferior to summer milk in antiscorbutic properties, corresponding to the differences in the cow's diet at these different seasons. In this connexion the suggestion is made that the value of winter milk in this respect might be raised if swedes were employed for winter feeding in place of mangolds, where possible. In the investigation of Chick and Rhodes alluded to above, the raw juice of beetroot, to which plant the mangold is nearly related botanically, was found to be much inferior to that of swede as an antiscorbutic.

4. No significant difference was detected in the growth-promoting properties of raw and dried milk respectively, and this was true with both guinea-pigs and monkeys. In both cases growth declined with onset of scurvy symptoms, but until this occurred the growth made upon diets containing dried milk was equal to that obtaining when equal rations of fresh milk were substituted.

References.—Chick, Hume, and Skelton (1918): I., THE LANCET, Jan. 5th; II., Biochemical Journal, xii., p. 132. Chick and Rhodes (1918): THE LANCET, Dec. 7th. Hess and Fish (1914): American Journal of Diseases of Children, viii., p. 386. Hess and Unger (1918): Proceedings of the Society of Experimental Biology and Medicine, xvi., p. 1.

A NOTE ON

IMMUNISED SKIN-GRAFTS.

BY ARTHUR L. YATES, M.C., M.D. LOND., F.R.C.S. EDIN.

CERTAIN German writers during the war described a process of rendering the skin immune to the toxins present in the wound for which the skin-graft was intended, and claimed that if skin immunised in this way was employed for skin-grafts the growth of epithelium was quicker and more certain than if the usual methods were followed.

Description of the Process.

The method consists of placing the dressing which has been in contact with the surface of the wound it is intended to treat, and which is therefore soaked in the discharges of the wound, upon an area of skin suitable for obtaining grafts by the Thiersch method and allowing this dressing to remain in position for 24 hours, after which it is replaced by another dressing removed from contact with the wound.

It was found necessary to moisten dressings on which the discharges had dried and to mark out the skin selected for yielding the graft by means of nitrate of silver.

Applied with these precautions, the skin to which the wound discharges were brought into contact was found to redden and to show on the third day of the application a slight prominence of the papillæ. It was necessary to watch the skin carefully at this point in the treatment, as it is of considerable importance to guard against the occurrence of a violent reaction. When the skin showed a marked elevation of the papillæ and slight reddening the treatment of the area was stopped for a day, but in most cases it was possible to treat the skin in this way for a period of seven days, after which the graft was ready for removal.

It was found that the severity of the reaction varied within rather wide limits, and that it was necessary to guard against a violent reaction. In two or three cases no reaction occurred. This was thought to indicate that the skin already possessed immunity to the organisms of the wound, and to a certain extent this view was borne out by the fact that the graft "took" readily in these cases.

Technique.

I found that the following technique gave the most satisfactory results.

The granulations of the wound were rubbed with dry unmedicated gauze and the graft removed by the method of Thiersch, applied to these granulations, and well pressed down. The graft was then covered with a piece of waterproof tissue, in which a number of holes of about one-eighth of an inch diameter had been cut, and the opposite edges of this waterproof tissue were fixed to the skin with adhesive plaster. This was then covered with unmedicated gauze and wool, and bandaged in position. The wound was examined every second or third day and any discharge removed by gently syringing through the holes in the waterproof tissue, which was not otherwise disturbed.

Results.

Applied in this way, I have not seen a case of failure by this method, although up till now I have only treated 27 cases, and of these only three were cases that had failed to give a successful result by the ordinary methods. Of these 27 cases, 10 were cases of ecthyma, where deep ulcers had developed and which had resisted treatment for several weeks previously to the grafting, 13 were cases of infected lacerations, where healing was delayed for several weeks, and 4 were cases of chronic ulcer, which had resisted treatment for a long time. In several cases a certain amount of movement of the limb was allowed, and all the cases in which walking with a fresh graft applied to some part of the lower limb was permitted, the graft took without any difficulty.

Local anæsthesia was employed in all the cases, and in the case of ulcers with thickened bases the ulcer also was anæsthetised and the thickened base punctured with a needle in numerous places after the method originally described by Tubby for freeing contracted scar tissue.

Although the character and small numbers of the cases in which I have made use of this method does not permit of any definite conclusion as to the superiority of this method over any previously employed, the method appeared to me to be based on such logical principles and, in the limited number of cases in which it has been tried, to have been so successful that I have ventured to bring it to the notice of those practitioners who did not have an opportunity of seeing the résumé of the original article, which appeared in the "Summary of the Foreign Press" issued to certain medical units of the Army. I regret that I have been unable to obtain the names of the German authors, but the impossibility of obtaining the literature must be my excuse.

Lincoln.

MUCUS DEPOSIT OF URINE.

BY S. G. BILLINGTON, M.B., B.S. LOND.,
LATE CAPTAIN, R.A.M.C; BACTERIOLOGIST, WOLVERHAMPTON GENERAL HOSPITAL.

IF a sample of this deposit in a febrile or convalescent urine be pipetted up from about the junction of the upper and second fourths it will show on direct examination an interlacing mass of strands, many resembling gigantic flagella. These structures are very dim and indefinite, and no satisfactory impression of their form can be obtained except under the low power and with the light, preferably daylight, almost entirely shut off.

If the deposit is washed with filtered water to remove the soluble constituents of the urine the same structures will still be dimly seen; but they at once stand out clearly on adding one drop of 10 per cent. tannic acid to the fluid film, and they will be seen lying in the midst of a coagulated homogeneous material. The structures also take up added watery stains at this stage, although they would not do so before the addition of the tannic acid. If the fluid-stained film obtained in this way is dried while under observation all the structures will be seen to disintegrate as the evaporating line crosses the field of vision.

When fixed and stained the structures show a most extraordinary variation in size and form, and resemble somewhat an interlacing mass of worms. They may be straight, curved, or wavy; some resemble gigantic spirochætes, others resemble more or less closely enormous trypanosomes or

FIG. 1.—Mucus deposit of urine. Flagellate-like structures lying in masses of coagulated matrix. Stained with methylene-blue.

Leishman-Donovan bodies. Bodies resembling miniature tadpoles with an apparent vacuole at the blunt end are also frequently seen. With the Romanowski stains the blue only is taken up. With Indian ink the general morphology is brought out more distinctly than in stained films, especially as regards the perfect fine flagellate-like extremities and processes.

Under the higher powers these structures appear to be made up of enormous numbers of filamentous strands. Some show darker centres, probably due to contained minute granules, and the forms resembling trypanosomes frequently contain one or more deeply staining bodies about the size of a red blood cell.

The Origin of the Deposit.

As far as I am aware, the mode and site of origin, the significance and the reasons for variation in amount of this substance, are shrouded in obscurity. There are, however, two points of interest. 1. When there is an actual excretion of organisms, as in bacilluria, and a catarrhal condition of the urinary tract may be presumed, the mucus deposit is slight or absent. 2. From chemical examination we are told that this substance in many cases is not true mucin, probably a nucleo-protein. 3. The structures described as being present in mucus deposits vary in size and texture much as in the case of casts. They are much larger and coarser in the urine from a case of febrile or post-febrile trench fever than in the case of influenza.

A year ago the urines of 300 men were examined with regard to the mucus deposit. 200 were patients in hospital

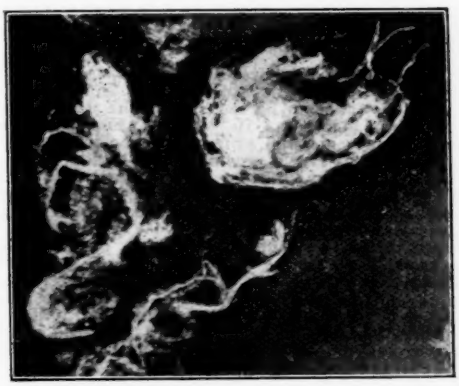


FIG. 2.—Masses of structures in the mucus deposit of urine resembling spirochætes. Stained with Indian ink.

and 100 were the staff of a medical unit. The urines of the 200 patients all showed a pronounced deposit, and the structures described could be readily seen with the lower power on direct examination. Over 70 per cent. of the controls showed a varying amount of deposit with similar structures. The difference in the bulk of deposit, however, in the two series was extraordinary, and would never have been realised unless series of 20 urines, 10 from patients and 10 from controls, had been placed in line. It may also be added that quite 50 per cent. of the controls had been marked for base duty on account of previous or existing disease of various kinds.

These examinations demonstrated that active disease produces a pronounced increase in the mucus deposit in the urine. In the absence of any definite knowledge as to the origin or significance of the mucus, knowing that the kidneys are the natural filters of the body and the urine the filtrate containing undesirable excreted products, it would not appear to be illogical to suspect that the addition to the deposit represents some form of the infecting agent after excretion.

The presence of spirochætes in the urine in trench fever and also in normal urine has been recorded on several occasions. One source of these spirochætes has been found by Japanese workers to be the urethral mucous membrane, and as to that source no comments can be made. The origin of morphologically perfect spirochætes from the deposit of urine, however, can be directly watched under the microscope. The mucus deposit is washed once, and to a sample on a slide a drop of tannic acid and watery stain are added, as previously described. The film is then gently dried, and as the evaporating zone crosses the field under observation all the large structures mentioned will disintegrate. It will be seen, however, that here and there one of the fine spirochætal-like processes apparently project beyond the hygroscopic surrounding matrix, and these will be left in the debris as morphological spirochætes.

FIVE CASES OF

SPONTANEOUS FRACTURE OCCURRING IN SERVING SOLDIERS.

BY C. NOON, F.R.C.S.,

TEMPORARY MAJOR, R.A.M.C.; OFFICER IN CHARGE OF THE SURGICAL DIVISION OF THE NORFOLK WAR HOSPITAL.

THE following cases of spontaneous fractures were admitted to the Norfolk War Hospital between November, 1916, and February, 1919. They illustrate some of the most important causes of pathological fractures of bones. They all occurred in serving soldiers. The information with regard to the diagnosis and treatment of spontaneous fractures to be obtained from the ordinary text-books on surgery is extremely brief and scanty. A study of these cases shows how important it is to make a most complete and careful examination of a patient suffering with a fractured bone.

Osteomyelitis Fibrosa (Medullary Fibromatosis) of the Right Humerus; Spontaneous Fracture; Union of the Fracture.

CASE 1.—W. G. J., a private, aged 19, was transferred to the Norfolk War Hospital on Jan. 28th, 1916, complaining of an injury to the right arm. The history of the patient's present condition was as follows. He stated that he had always been a healthy youth, and had suffered with no previous illness, except that he had twice previously met with slight injuries to the right arm, which had resulted in fractures. The arm was "set" by a doctor, and on both occasions after rest in splints it united. The first fracture occurred at the age of 14, and resulted from throwing a cricket-ball. A year later he again broke the same arm by falling off a bicycle. In December, 1915, at the age of 19, his arm was again broken while driving a horse and cart, a sudden jerk of the reins causing the fracture. As far as he was able to judge all the other bones of his body were natural and quite strong. No other members of his family, as far as he could tell, had ever suffered with repeated fractures. His father and mother were both quite healthy.

Condition on admission.—The patient was a well-developed healthy youth; temperature normal; pulse-rate 80 per minute. Pupils equal and reacted normally to light and accommodation; teeth good and quite clean; no discharge from ears. Chest, heart, and lungs natural; abdomen natural.

The muscles of the upper arm and forearm were wasted, but the hand muscles were natural. There was a slight angular deformity and swelling in middle third of upper arm. The elbow could not be completely flexed or extended. On palpation there was a well-marked thickening in the middle third of the humerus; the swelling was tender to touch, hard, and felt bony, and could not be distinguished by palpation from callus formed around a uniting fracture. Crepitus could not be obtained, but there was abnormal mobility to be felt in middle third of humerus. There was half an inch of shortening of the right upper arm. The axillary glands were not enlarged. The sensation of the arm and hand was not impaired.

X ray examination showed a fracture through middle third of right humerus. In this situation there was a spindle-shaped enlargement of the bone. In the interior of the bone the osseous tissue had been replaced by clear areas which, from their even contour, sharp definition, and translucency, suggested the presence of cysts. X ray examination of the other bones of the body did not reveal anything abnormal. Wassermann reaction was negative.

Treatment.—The fracture was treated by the usual method of splinting protection and massage. It united rather slowly, but except for rather an excessive amount of pain, felt especially at night, at the seat of injury the broken bone did not behave in any abnormal way, in spite of the disease at the site of fracture.

Remarks.—The two main factors for consideration in this case were, firstly, the diagnosis and, secondly, the correct treatment. In considering the diagnosis, the points of importance are the age of the patient and the long duration of the disease—five years almost excludes the possibility of malignant disease.

"The diagnosis from other chronic affections of bone was readily made with the assistance of skiagrams. These showed that the contour and architecture of the bones were greatly altered; there was a localised increase in the girth; the surface of the bone was uneven, and in the interior the osseous tissue had almost disappeared, and there were clear areas which, from their even contour, sharp definition, and translucency, suggested the presence of cysts." (Thomson and Miles.)

With regard to treatment the affected bones should be protected from injury. If fractures should occur every attempt must be made to prevent deformity, and to fix the parts by the aid of splints for a considerable time. Union will generally take place, but will be slow, and repeated fractures are likely to occur. It is improbable that any operative procedure on the fracture will meet with good result, but scraping away the disease from the interior of the bone where there has been no fracture may sometimes be followed with good results.

Multiple Gummata of the Bones of the Left Foot; Spontaneous Fractures; Improvement.

CASE 2.—J. C., aged 41, was admitted to the Norfolk War Hospital on Nov. 29th, 1917, complaining of swelling of the left foot. The history of the present condition was as follows. The patient had been in his usual health until about two months ago, when he noticed swelling of the left foot. This was increased by exercise, and he was unable to march. He had been serving in the Army for three months before he noticed the disability. The condition of the foot had caused him little pain, but he had noticed sharp pains shooting down both legs for the last three or four months. He had contracted syphilis 19 years ago, for which he was treated.

Condition on admission.—The patient was a fairly healthy looking man. Temp. 98·4°. Special senses, such as hearing, smelling, tasting, and seeing, normal. Pupils unequal, the right did not react to light and left pupil sluggish, but a faint reaction to light could be obtained. No nystagmus. Disc normal; no squint on narrowing of palpebral fissure. Nothing abnormal discovered on examination of remaining cranial nerves. No paralysis on spasm of any of the muscles of arms or legs and no incoördination. Dullness of sensation over both legs and feet, but no absolute loss of sensation. Sensation to heat and cold natural. Knee-jerks present, but no ankle clonus and no Babinski sign. No wasting of muscles of arms or legs. No loss of control over sphincters. Memory and mental power apparently normal. Chest, heart, and lungs natural; abdomen natural.

Local condition.—The skin over the left foot looked natural, but the foot was swollen and pitted on pressure. Well-marked flat foot. The dorsum of the foot looked unduly prominent. There was little or no pain on manipulation of the foot. The bony point could not be easily palpated, owing to swelling and thickening of tissues. No crepitus could be obtained.

X ray examination showed the bones of the foot rarefied. All metatarsal bones were fractured at their base. There was some evidence of new bone formation around seat of fracture. Wassermann reaction was negative.

Treatment.—The patient was put on a course of potassium iodide and mercury, given by the mouth. The fractures were treated by the application of splints, rest, massage, and electrical treatment. Great benefit followed these lines of treatment. There was great improvement in the general condition of the patient. Locally the condition of the foot improved and the fractures united.

CASE 3.—J. M., a private, aged 38, was admitted to the Norfolk War Hospital complaining of swelling of the left foot. The history of the present condition was as follows. The patient stated that he was quite well until early in September, 1918; he then twisted his foot on parade and noticed that when he removed his boot the same evening the foot was swollen. He was unable to get his boot on next morning and the foot remained painful for four or five days. He also experienced shooting pains in the left leg as far as the knee. Walking increased the pain in the leg and discomfort in the foot. The swelling gradually subsided, but some deformity and swelling still persisted.

Previous history.—The patient said that he suffered with gonorrhœa in 1901, whilst he was stationed in Ireland. He was treated successfully for several weeks. In 1915 he trod on a nail. It entered the sole of the foot in the situation of the head of the fifth metatarsal bone. The wound suppurated, and an operation was performed to drain an abscess. After the operation the wound healed well, and he recovered with complete use of the foot. He stated that he had never suffered from syphilis.

Condition on admission.—The patient was a healthy-looking, well-nourished, and muscular man. Temp. 98°; pulse 80. He answered questions with intelligence. The special senses appeared normal. Eyes: pupils unequal, right dilated, left contracted, both reacted sluggishly to light and accommodation. No squint and no nystagmus, fundus was natural, tongue protruded straight, tremulous, and furred; fauces natural. The remaining cranial nerves were normal.

No paralysis or spasm of any of the muscles of arms or legs and no incoördination. Dullness of sensation over both legs and feet, but no loss of sensation to heat and cold. Knee-jerks exaggerated, especially on left side. Babinski's sign well marked in left foot and present, but less well marked, in right; no ankle clonus.

Examination of left foot.—The skin over the left foot looked natural, but the foot was swollen and œdematous, the dorsum being unduly prominent. The normal arch of the foot had disappeared, and there was well-marked flat foot. There was little or no pain on palpation. The bony points of the foot could not be easily felt owing to swelling and thickening of tissues. On deep palpation in the region of the base of the first metatarsal bone crepitus could be obtained, but manipulation produced very little, if any, pain.

On X ray examination of the left foot the tarsal bones were found to be rarified. There was a fracture in the situation of the base of the first metatarsal bone. In the situation of the fracture there was marked destruction and absorption of bone, and around the fracture some evidence of new bone formation. There was also a fracture of the second and fifth metatarsal bone, with marked absorption of bone. Wassermann reaction (blood) was positive.

Treatment.—The patient was given a course of potassium iodide—20 gr. three times daily for six weeks—and mercury by the mouth. The fractures were treated by splints, rest, massage, and electrical treatment. Great benefit was derived from the treatment, both generally and locally. The fractured bones united.

Remarks on Case 2 and 3.—Case 2: There was a definite history of syphilis, but the Wassermann reaction was negative. Case 3: Syphilis was denied, but the Wassermann reaction was positive, and the signs and symptoms of the case were such as to justify a diagnosis of syphilis. A diagnosis of gummata osteitis was considered to be the condition from which both patients were suffering. Both showed symptoms and signs of tertiary syphilis, and both showed marked signs of improvement on the administration of active syphilitic treatment.

Chronic Suppurative Otitis Media; Abscess of the Thigh; Bony Swelling of the Right Femur; Spontaneous Fracture of the Second Metatarsal Bone of the Left Foot.

CASE 4.—A. R., a private, aged 19, was admitted to the Norfolk War Hospital on Nov. 22nd, 1918, complaining of a painful swelling in the right thigh and swelling of the left foot. The history of the present condition was as follows. The patient said that he was quite well ten days previously. For the last week he had had pain and swelling of the right thigh. This had gradually got worse—he could not account for the swelling, as there had been no injury. The left foot became swollen three days previously, when he reported sick, and since then had been painful. Had had discharging ears as long as he could remember.

Condition on admission.—The patient was an ill-developed and badly nourished youth, who looked ill and pale. Temp. 99°; pulse 80. Very deaf, profuse discharge from both ears, no mastoid tenderness. Eyes natural, teeth very bad, many carious. Chest, heart, and lungs natural. Abdomen natural. On the outer side of the middle third of the right thigh there was a well-marked swelling which extended from 2 inches below the great trochanter to within 1 inch of the knee joint. The skin over the swelling was not red or discoloured, but on palpation it felt hotter than the skin of the opposite side. The swelling had fairly well-defined margins, was painful to touch, and fluctuated at its centre. The femur felt thickened and irregular in its middle third.

X ray examination of left femur showed on anterior aspect of middle third a localised bony swelling attached to the bone and tapering at both ends into its substance. Outline of shaft of femur natural. The appearance shown in the X ray photograph is indistinguishable from the condition described as traumatic myositis ossificans. Over the dorsum of the right foot the skin was reddened and inflamed, hot to touch, and rather painful, but there was not so much pain on manipulation as might be expected from the appearance of the part. There was no fluctuation. X ray examination of the foot showed a fracture of the shaft of the second metatarsal bone. The other bones of the foot appeared natural.

Treatment.—An operation was performed on Nov. 24th under chloroform. An incision was made into the swelling on outer side of left thigh and a considerable quantity of purulent matter evacuated. The swelling appeared to be a breaking down hæmatoma. The abscess was drained. Bacteriological examination of the pus showed presence of staphylococci.

Progress and remarks.—There are three conditions for diagnosis in this case: (1) Abscess of the thigh; (2) bony swelling of femur; and (3) spontaneous fracture of the second metatarsal bone. With regard to the thigh condition the X ray appearance strongly suggests the condition known as traumatic myositis ossificans, but in the presence of an abscess it is difficult to exclude the possibility of chronic inflammation as the cause of the bony swelling; in other words, the condition may be a chronic pyæmic abscess with inflammatory thickening of the underlying bone.

The reason for the spontaneous fracture of the metatarsal bone does not appear clear unless the cause could be one of general debility and toxæmia associated with excessive absorption of septic material from the ears and teeth. The abscess of the thigh healed well. The fracture of the second metatarsal bone of the foot gave little trouble. It was treated by splints, rest, and massage. At the end of a month the patient could walk without pain.

Periosteal Sarcoma of the Lower Third of the Right Thigh; Spontaneous Fracture; Amputation of the Thigh.

CASE 5.—A. McI., a private, aged 19, was transferred to the Norfolk War Hospital on Jan. 20th, 1919, complaining of swelling of the right knee. The history of the present condition was as follows. The patient stated that he was quite well until May, 1918. He then noticed slight pain in his right knee, perhaps caused by a twist. It was not severe, but gradually got worse, although it did not cause him enough trouble to report sick before Oct. 2nd, 1918. He was passed through a field ambulance, a casualty clearing station, and a general hospital, the condition being then diagnosed on his field medical card as synovitis of the right knee. On Oct. 8th he was evacuated to England. Since October, in spite of treatment, the knee had gradually got worse. It had become more swollen and he had been unable to move it without pain, which had been especially severe at night, often keeping him awake for many hours. He had noticed that in spite of increasing swelling of the knee the muscles of the leg had become very wasted. He had lost weight rapidly; he had no cough.

Condition on admission (20-1-19).—The patient was a pale, ill-nourished youth; obviously in pain. Temp. 98·4°; had occasionally been 99° at night during the last month. Pulse 80; respiration 20. Eyes: pupils equal, react to light and accommodation. Tongue clean; teeth fair, some caries. No scars at angle of mouth. Ears; no discharge. No enlarged lymphatic glands felt in neck or axilla. Chest wall poorly covered. Skin dry; little subcutaneous fat. Heart and lungs natural. Abdominal wall very thin, nothing abnormal discovered in abdomen. No enlarged or palpable iliac glands. Inguinal glands palpable, both not markedly enlarged.

Local condition.—The patient lay with the right knee flexed, unable to extend or move the joint without severe pain. There was marked swelling of right knee-joint, the swelling having the characteristic form of distension of the synovial cavity, except that the swelling was especially prominent on the inner side of the joint just above the internal condyle. The skin over the joint looked natural; no enlarged veins over the swelling. Marked wasting of muscles of thigh and calf. On palpation the skin over the joint felt hot, the joint being very tender to touch, so that any attempt at movement caused great pain. An irregular, ill-defined swelling could be felt over and above the internal condyle. The upper margin of the swelling could be palpated 1 inch above the condyle, but no lower margin could be palpated. The swelling did not fluctuate. The lower end of the femur felt enlarged and there was abnormal mobility to be made out. The situation of the bony points was natural; no riding of the patella. There was 1½ inches of wasting in the thigh and calf of right leg. The circumference of right knee-joint was 1½ inches greater than that of left. There was no loss of sensation and reflexes were natural. Wassermann reaction was negative.

X ray examination showed very extensive destruction of bone at the lower end of the femur. At one situation the destruction had been so great that the bone appeared to have been "eaten" through. There was no evidence of any new bone formation. Microscopic examination of a sector removed from the growth showed that the growth was a spindle-celled sarcoma.

Treatment.—Amputation of the thigh.

Remarks.—This case illustrates a not unusual mistake in diagnosis, the case being first diagnosed as synovitis of the knee. The importance of an X ray examination in all cases where there is any suspicion of disease of a joint cannot be over-estimated. It is probable that this case would have shown changes in the bone had an X ray been taken when the case was first seen. The second point of interest is the X ray appearance, the destruction of bone being very considerable and the appearance being not unlike that exhibited by a case of advanced necrosis.

Clinical Notes:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

THE EFFECTS OF EXPOSURE UPON THE TERMINALS OF HANDS AND FEET.

BY F. JEEVES, L.R.C.P. & S. EDIN., L.R.F.P.S. GLASG.,
CAPTAIN, R.A.M.C.(T.); MEDICAL OFFICER, H.M. HOSPITAL SHIP ——;
AND
E. R. HUNT, M.D. CANTAB., M.R.C.P. LOND.,
LIEUTENANT-COLONEL, R.A.M.C.(T.C.); CONSULTING PHYSICIAN TO THE NORTH RUSSIAN EXPEDITIONARY FORCE.

THE following case illustrates the different effects of exposure to (1) alternating extremes of temperature, (2) prolonged low temperature:—

Corporal W. B., aged 39, a monumental mason in civilian life, came out to North Russia on Oct. 1st, 1918. He had since been employed at the base. He gives a history of having been rejected for the Army in 1914—be believes on account of his teeth. He was in France from January, 1917, to October, 1917, where he was gassed, but did not suffer from trench-feet or frost-bite.

From Oct. 20th to Dec. 16th, 1918, he was employed in building stoves. As is customary among Russian masons, a mortar was used composed of clay and sand. The workmen use this with their hands instead of with a trowel, as in England, and they dip their hands at frequent intervals in extremely hot water to prevent the mortar sticking to them. He did the same. The weather was very cold, and his hands were consequently being exposed to extremes of heat and cold alternately. His feet, on the contrary, were constantly wet and cold, for he was unable to wear his Shackleton boots, and his ordinary boots were wet through, as he was frequently standing in water. He was wearing these wet boots for many hours daily. The first parts affected were

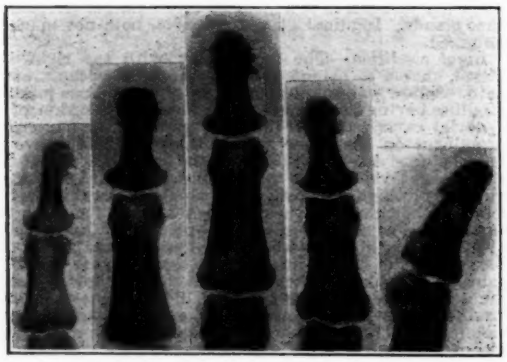


FIG. 1.—Shows increased bone formation in the fingers.

his hands and left great toe; then the other foot. They swelled up and "the nails seemed to spread." He had pains of a stinging character, worse when the hands and feet were getting warm again and after he had stopped moving about. The pain in his toes at night kept him awake.

He continued to work in spite of the pain until Dec. 16th, 1918, when he went sick on account of the severity of the pain in his left great toe. He states that he had little blisters at the bases of his finger-nails, but that his feet were not blistered, although distinctly blue. He was admitted to the hospital ship on Dec. 19th.

I (E. R. H.) saw him for the first time some three weeks later. He was then recovering and was able to be up and about the ward. The terminal phalanges of all his fingers, his thumbs, and the toes of both feet were much enlarged, presenting the appearance of clubbed fingers and toes seen in cases of congenital heart disease, though without the discolouration usual in this condition. Sensation to pin-prick was very much diminished over the terminal phalanges of his right thumb and forefinger and middle finger. The level of diminished sensation extended down to the middle of the second phalanx of the right ring finger and to the joint between the first and second phalanges of the right little finger behind, and to the metacarpo-phalangeal joint of the same finger in front. The left hand was less affected, but sensation was diminished over all the terminal phalanges. A very similar distribution of impaired sensibility was present over the toes of both feet. The knee-jerks were normal, but plantar reflexes only just obtainable. His pupils reacted to light. The lungs were normal. The first sound at the apex of the heart was reduplicated.

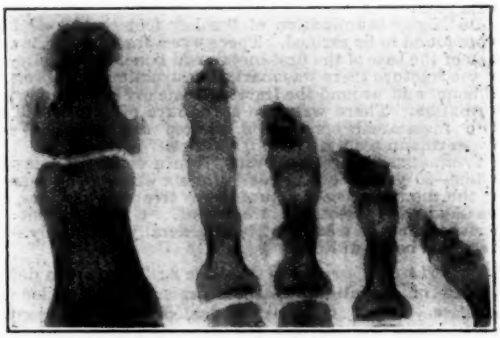


FIG. 2.—Shows erosion of the terminal phalanges of the toes.

The excellent skiagrams, for which I am indebted to Captain H. J. Cotter, M.C., R.A.M.C., show an interesting condition of the bones of the terminal phalanges of both hands and feet. In the fingers these bones show increased bone formation, whereas the terminal phalanges of the toes are eroded.

These different conditions illustrate remarkably the effects of alternating extremes of temperature as compared with that of prolonged exposure to cold only. The distribution of the sensory changes point to injury of the nerve endings and not to any peripheral neuritis. There was nothing to suggest a functional origin. The similarity of the sensory changes in both hands and feet suggests that the bone changes were caused by direct action of the temperature on the blood-vessels, and not primarily by interference with vaso-motor action through the damage to nerve-endings.

North Russia.

A CASE OF KERATODERMIA BLENNORRHAGICA.

BY S. C. DYKE, M.B., B.CH. OXON., D.P.H. OXON.,
ASSISTANT BACTERIOLOGIST, COLLEGE OF MEDICINE, NEWCASTLE-UPON-TYNE.

As details have been published of comparatively few cases of keratodermia occurring in association with gonorrhœa, the following may be of interest:—

The Case Described.

Patient, a private in a Labour Company in France, who, throughout his illness denied having ever had any venereal disease, was taken ill with "pains in the joints" about the last week of April, 1918. On May 5th he was admitted to a C.C.S.; temperature was then 100·6° F. and the left knee was greatly swollen. A diagnosis of acute rheumatism was made. Salicylates were administered and 50 c.cm. of turbid fluid showing polymorphonuclear lecuocytes was aspirated from the left knee. On May 23rd the notes record swelling of the joints of the right shoulder, wrist, and hand.

He was admitted to hospital in England at the beginning of June. The affected joints were all still swollen and tender, though not containing appreciable fluid. A soft systolic bruit was present at the apex which was in the fifth intercostal space, half inch internal to the vertical nipple line. Patient was weak and emaciated. There was still irregular pyrexia, up to about 100·5° F. at night. Salicylates gave no relief and were discontinued.

Condition of the Patient's Feet.

About the beginning of July the condition of the patient's feet began to attract attention. On admission the skin of the plantar surface was thick and calloused and showed a

tendency to come off in crusts. This is a state of affairs occasionally seen in men after they have been in bed some weeks, and no particular attention was paid to it until it was noticed that as the flakes separated they did not leave clean pink skin underneath; on the contrary, as the flakes of thickened epidermis came away new ones formed underneath them. This condition became rapidly aggravated until the whole plantar surface, the sides of the feet, and the dorsal surfaces of the ungual and, to a less degree, of the second phalanges were covered with a thick horny layer of desquamating epidermis. Cracks appeared in this

FIG. 1.—Feet before commencement of vaccine treatment.

desquamating layer, which was shed in fragments from the size of half-a-crown to a fine dust. As fast as the epidermis was thrown off further keratisation occurred in the underlying epithelium, which was later in its turn desquamated. The process went on underneath the nails, most of which in time separated and came away. Some traces of the same condition, in the shape of a branny desquamation around

FIG. 2.—Feet one month after commencement of vaccine treatment.

the finger-nails, occurred on the hands. The palms were not affected. No inflammatory reaction accompanied the process, which was almost painless.

On June 6th a little sugar was present in the urine; this was absent at the next examination a few days later and thereafter.

Treatment with Gonorrhœal Vaccine.

At the end of June the case came under my care. The association of an arthritis, not responding to salicylates, with hyperkeratosis aroused suspicions of gonorrhœa. On looking for it a scanty purulent urethral discharge was found, which on examination by the pathologist to the hospital, Major A. G. Gibson, R.A.M.C., was found to contain Gram-negative diplococci. Further investigation revealed similar cocci and prostatic threads in large quantities in the urine. The Wassermann reaction was negative.

On the strength of the pathological report a course of gonococcal vaccine was given from July 10th to August 10th. A start was made with a dose of 5 millions, the dose being worked up to 300 millions, and 850 millions being given in the course of the month. The improvement in the condition of the feet was immediate and marked. After the first few doses the further keratisation beneath the already separating epidermis ceased, and at the end of the month most of the thickened skin had separated, leaving normal epidermis beneath. At the same time the pyrexia ceased. The joint condition, which, under radiant heat and massage, was improving before the commencement of the vaccine showed no marked change.

About the middle of August the patient was evacuated to an auxiliary hospital. His general health was then excellent. The condition of the skin was normal, but there were still considerable thickening and stiffness of the affected joints, particularly of those of the right hand. The urethral discharge had disappeared.

Remarks.

The points of interest in this case would seem to be:—1. The association of the skin condition with what was evidently a very severe attack of gonorrhœal arthritis. 2. Its late appearance in the disease. 3. Its prompt disappearance under vaccine treatment.

Oxford.

CRYPTOPODIA: AN UNDESCRIBED DISEASE.

BY E. C. BOUSFIELD, L.R.C.P. LOND., M.R.C.S., D.P.H. CAMB. & LOND.,

DIRECTOR, CAMBERWELL RESEARCH LABORATORIES; BACTERIOLOGIST CAMBERWELL AND HACKNEY.

THE remarkable case described below, unique, so far as I have been able to discover, came under my notice whilst taking a "busman's holiday" in charge of the practice of my friend, Dr. T. T. Brunyate, of Woodstock, by whose kind help I was able to get the patient to London for exhibition at a scientific meeting.

History of the Case.

The patient, a fresh-complexioned woman of 44, had never been out of the country. Enlargement of the feet was first noticed at the age of 15, coming on during the day and disappearing during sleep. In the following year it increased so much whilst she was in service that she sought advice as an out-patient at St. Bartholomew's Hospital, but attended once only, as she had to leave her situation. She appears

FIG. 1.—Dorsal aspect, showing the widely-separated hair-follicles.

to have continued in service, though with increasing difficulty, until her twenty-fifth year, when she was attacked by rheumatoid arthritis, which left her hands crippled, and since then the feet have got steadily worse, so that for ten years she has not been able to walk.

The photographs which I took of her in the Woodstock Infirmary show the condition better than any description. At the first glance the suggestion is that of elephantiasis, but the fact that the toes are not involved in the tumour, and

the great separation of the hair-follicles, indicating distension, not hypertrophy, together with the translucency of the tumours, negative the idea of that disease.

The swelling extends from about three inches below the knees, and involves the whole of both legs and the dorsa of the feet, but stops absolutely short at the margins of the soles, or rather folds over about half an inch higher all

FIG. 2.—Plantar aspect, showing growth protruding between the toes.

round. Round each ankle there is a well-marked collar, with protuberances not coinciding with any anatomical structures. The skin pits deeply on pressure, but there is neither pain nor tenderness.

Heart, lungs, and kidneys are sound. A somewhat hasty blood count showed 32 per cent. polymorphonuclear leucocytes, 17 per cent. transitionals, 51 per cent. small lymphocytes, but neither large mononuclears nor eosinophiles. The red cells were very irregular in size, varying from 0·5 to 1·5 of the normal, but poikilocytes were few.

Remarks.

The condition of the blood seems to indicate profound myeloid or lymphatic changes, especially as there was marked leucopenia. No mechanical obstacle to the return flow of blood or lymph appears adequate to explain the peculiar features, the immunity of the feet for example. Numerous specimens of blood taken at night failed to show evidence of filaria. The only suggestion as to the nature of the case was that it might be a variant of Milroy's disease, but there is an entire absence of hereditary element.

Note.—Since the above was written my attention has been drawn by Colonel McAdam Eccles to a case which he published in the *St. Bartholomew's Hospital Journal* in April, 1906. He described it as a case of elephantiasis, and, as the toes appear to partake in the enlargement, this is probably correct, though I cannot pretend to decide in the absence of more exact details. My own case is now in the same hospital, under Dr. Morley Fletcher, and is improving greatly under thyroid treatment, though why it should is hard to say. The skin, as it contracts, is piling up into thick ridges, so that there has evidently been some hypertrophy.

De Crespigny Park, S.E.

LITERARY INTELLIGENCE.—Messrs. W. Heffer and Sons, Ltd., Cambridge, announce the early appearance of "Groundwork of Surgery for First Year Students," by Mr. Arthur Cooke. The book is intended for students just beginning clinical work in the wards or out-patient department.

MR. WILLIAM LAUZUN BROWN.—The death is announced of Mr. W. L. Brown, L.R.C.S.Edin., L.R.C.P. Glasg., who before qualifying as a medical man was attached to the editorial office of THE LANCET, first as a medical reporter and latterly as one of the sub-editors. He was a good shorthand writer and, having won a competition in stenography while a Scottish medical student, he attracted the attention of Sir William Gowers, at that time closely connected with the editorial staff of THE LANCET, and to Gowers Mr. Brown owed his start at this office. He did much useful work for THE LANCET for nearly five years, especially in taking charge of the reporting of various congresses and medical meetings. In 1894 he returned to Glasgow to complete his medical education, and on obtaining the Scottish diplomas went into general practice in London. He remained attached to journalism, and in papers and from platforms was the advocate of medical movements of various sorts. He was a member of the Finsbury Borough Council and Holborn Board of Guardians.

Reviews and Notices of Books.

Mortality Statistics of Insured Wage-earners and their Families in the United States and Canada. By LOUIS I. DUBLIN, Ph.D., Statistician. With the collaboration of EDWIN W. KOPF, Assistant Statistician, and GEORGE H. VAN BUREN, Supervisor, Statistical Bureau. New York: Metropolitan Life Insurance Company. 1919. Pp. 397.

THIS publication presents the mortality statistics of the Industrial policy-holders of the Metropolitan Life Insurance Company for the six-year period 1911 to 1916, with a supplement for the year 1917. The statistics are essentially those of the wage-earning group of the population. In view of the circumstances and time covered, and the care exercised in gathering, editing, and tabulating the data, it is safe to say that these statistics constitute one of the best indices available of mortality and its causes among wage-earners and their families. Those working in mortality statistics, especially in connexion with life insurance, will find much to interest them. In order fully to appreciate the facts careful study is necessary, and many important matters are presented which are not to be found in works published in this country, such as the comparative mortality of the white and coloured races at the various age-periods. The comparative mortality from different diseases in the industrial population on the one hand, and in the general population on the other, forms an interesting study, and here the area covered by the data—it includes nearly all the states of the United States and the provinces of Canada—makes the investigation particularly valuable. The statistics, indeed, reflect the sanitary and social conditions prevailing throughout the industrial population of two great national units. The members of wage-earners' families are also accounted for in good measure, for a very large proportion of the total number of persons observed are the wives and children of wage workers.

The number of diseases dealt with is, of course, large, but attention may be usefully directed to certain maladies, such as tuberculosis, cancer, and syphilis, whose rates of incidence are especially interesting to official medicine. Taking first *pulmonary tuberculosis*, a total of 99,906 deaths is reported under this head, corresponding to a death-rate of 185·7 per 100,000 in the six years 1911 to 1916. A table is given showing the mortality from this disease, classified by colour, sex, and by age-period. The group of coloured persons in this experience displays a pulmonary tuberculosis death-rate at all ages between two and two and one-half times that of white persons. One interesting feature is the comparatively early age at which the maximum death-rate is found among the negroes—namely, between 20 and 24 years of age. Among white males the maximum is reached between 35 and 44 years, and among white females between 25 and 34 years. Further, the mortality from tuberculosis of the lungs among coloured males at the age-period 5 to 9 years is over ten times as great as among white males at that age. In discussing the comparative mortality from pulmonary tuberculosis among the industrial and general population respectively, it is shown that among insured white males, at all ages, the mortality is 31 per cent. higher than among all males of the general population. Females in the families of wage-earners showed an excess of only 13 per cent. Another point of interest brought out is that the children of wage-earners who reside in cities and are presumably more exposed to infection and to the hardships incident to their economic stratum, show no higher rates from pulmonary tuberculosis than children in the general population, of whom one-half reside in rural areas. Judging by the way in which children are housed in this country in country districts this experience is not so surprising as it appears at first sight.

Turning now to *cancer*, the statistics show that white males show emphatically higher cancer death-rates at every age period than were recorded for coloured males. Comparisons between the cancer death-rates of white and coloured females are practicable beginning with the age-period 25 to 34 years. Between 25 and 44 years the cancer death-rates of white females were decidedly lower than the rates for coloured females. Between 45 and 54 years the rates were practically the same. Beginning with the age-period 55 to 64

years and continuing to the highest age-period in the table, the cancer death-rates of white females were higher than the rates for coloured females.

In discussing the mortality from *syphilis* the authors remark that statistics are likely to be fallacious because of the tendency of medical men to conceal this disease in their reports of causes of death. But even the figures, defective as they are, serve to indicate some important relations (of syphilis mortality) in the several colour and sex classes. The death-rate among coloured lives is consistently higher than among whites. The rates are about 3 to 1. The rates are much higher for males than for females in each one of the colour groups.

The figures concerned with the mortality from other diseases are similarly considered, the whole work forming a valuable addition to our statistical knowledge of the causes of death in the varying conditions of race, age, and sex. The authors may be congratulated on the success of their endeavours in collecting and criticising an enormous mass of material, and the results will doubtless be received with the greatest interest by all concerned in the insurance world.

Aids to Ophthalmology. By N. BISHOP HARMAN, M.A., M.B. Cantab., F.R.C.S. Eng. Sixth edition. With 163 illustrations. 1919. London: Baillière, Tindall, and Cox. Pp. 226. 3*s.* 6*d.*

WE can thoroughly recommend this little book to every student of ophthalmology. It is written in an easy, interesting style, and contains as much useful information in proportion to its size as any book we know. Moreover, it can be carried about in the pocket. The chapters on the external diseases of the eye include some elementary bacteriology of the conjunctiva. The different forms of cataract are clearly explained. The main facts about glaucoma are stated, while the controversies to which it has given rise are left on one side. The chapters on refraction and the fitting of glasses are practical and sufficient. When he comes to the ophthalmoscopic diagnosis of fundus disease the student will need to supplement what he finds here. There is, for instance, no mention of such a common disease as albuminuric retinitis. References are given, however, to ophthalmoscopic atlases, one of which would be found a most useful adjunct by the beginner.

The chapter on Ocular Therapeutics, while excellent so far as it goes, does not go very far. The advice, however, to use nitrate of silver in a solution of glycerine and to compare its action with that of the newer proprietary silver salts on patients who have both eyes affected with conjunctivitis is worth following. Of the additions in the sixth edition, compared with the fifth, we note a new chapter on Diseases of the Vitreous, and the inclusion in the final chapter on operations of a description of the author's reefing operation for the advancement of a muscle in cases of squint. This operation, in its originator's hands, has given good results and it does not entail the bandaging of both eyes and consequent confinement to the house or hospital; but it is a difficult one to perform. A chapter on Eye Conditions in School Children is of special value, embodying the author's experience of many years' work in connexion with the public elementary schools of London.

Constipation and Allied Intestinal Disorders. By ARTHUR F. HURST, M.A., M.D. Oxon., F.R.C.P., Physician and Neurologist to Guy's Hospital; formerly Consulting Physician, Salonica Army. Second edition. London: Henry Frowde, Hodder and Stoughton. 1919. Pp. 440. 16*s.*

THE present volume, though described as a second edition of the book first published in 1909, is very largely a new publication. Much has been rewritten, and new chapters have been added on such subjects as methods of examination, intestinal adhesions, visceroptosis, stasis in the cæcum and ascending colon, and spa treatment. While the book presents the results of the author's own observations, it also embodies the more important facts relating to the subject to be found in the English, the American, the French, and the German literature. The subject-matter is divided into convenient sections. The first of these deals with the physiology of the intestinal movements and of defæcation, and includes an interesting account of "mass peristalsis," the term which is now usually employed to describe the movements of the colon. The next section deals with methods of examination. These include the usual physical examination; the giving of charcoal lozenges, by which device it is possible to estimate the total time taken in the passage of any particular meal through the alimentary canal; examination by X rays; the examination of fæces by physical, chemical, and bacteriological methods; and, finally, examination of the lower bowel by the sigmoidoscope. Section 3 treats of the causes of constipation: factors influencing the passage of intestinal contents along the colon are first considered and then the causes of "dyschezia" or defective defæcation are passed in review. The next section considers the symptoms of constipation in all their protean manifestations. Section 5 is concerned with treatment, and the importance of prophylaxis is duly emphasised. The majority of cases of constipation, as the author insistently teaches, can be cured without drugs if proper treatment is instituted at a sufficiently early stage. Indeed, in dyschezia purgatives are either absolutely useless or they only have an effect when fluid stools are produced, a considerable quantity of fluid and nutritive material being thereby wasted. Two further sections deal with the rather more special subjects of constipation in infants and in soldiers.

The book is illustrated by 56 figures, most of which are reproductions in black and white outline of bismuth meal investigations. It is seldom that the reader of medical monographs meets with an account of a subject so rationally set forth and in which the conclusions are so intimately based upon direct experiment and observation. The author is to be congratulated upon the scientific acumen which has shaped his labours.

Heredity. By J. ARTHUR THOMSON, M.A., LL.D., Professor of Natural History in the University of Aberdeen. Third edition. London: John Murray. 1919. Pp. 627. 15*s.*

A THIRD edition has just appeared of this valuable manual, published originally 12 years ago. During that time it has served, as it was intended to do, as an introduction to the study of heredity, and the fascinating interest of the subject and its great practical importance have been proved by the success of the manual. Professor Thomson has furnished a book which illustrates for the benefit of those who are not experts in biology the main views which are held in this sphere. He defines the terms in common employment, and discusses the accepted theories as to the physical basis of inheritance, showing how the tendency to breed true is subject to variations, fluctuations, and mutations. Disputed questions like telegony and the transmission of acquired characteristics are dealt with in comprehensible language; a long chapter on heredity in disease may be commended to all our readers, and the same may be said for the exposition of Mendelian law. The whole book is, as we have said before in much the same terms, fascinating and instructive, while apt illustrations and a full index add to its value.

Manual of Anatomy, Systematic and Practical, including Embryology. Originally written by the late A. M. BUCHANAN, M.A., M.D., C.M., F.R.F.P.S. Glasg. Fourth edition. With 677 illustrations. London: Baillière, Tindall, and Cox. 1919. Pp. xii. + 1743. 30*s.*

THE general arrangement of this edition remains as in the last, and the old terminology is still adhered to. The book is now in the hands of a committee of London anatomists, who have made only a few alterations in the text, and are clearly waiting for an increase in their number before dealing at all drastically with the revision of the whole work.

Studies on Acari. No. 1, the Genus Demodex, Owen. By STANLEY HIRST. London: Longmans, Green, and Co. 1919. Pp. 44 + xiii. 10*s.*

Mr. Hirst has carried out a very painstaking research into the distribution and morphology of the genus *Demodex*, and has discovered the parasite in certain mammals in which until now it has not been known to occur. His descriptions are careful and clear, and are admirably illustrated in 13 plates and four text-figures.

FRENCH SUPPLEMENT TO THE LANCET

Under the Editorial Direction of

Professor CHARLES ACHARD, PROFESSOR OF PATHOLOGY AND THERAPEUTICS IN THE UNIVERSITY OF PARIS.

AND

Dr. CHARLES FLANDIN, D.S.O., CHEF DE CLINIQUE À LA FACULTÉ DE PARIS.

RADIOLOGICAL EXAMINATION OF PSEUDARTHROSES BEFORE AND AFTER OPERATIONS OF BONY GRAFTS.

BY PAUL AUBOURG,

PROFESSOR AGRÉGÉ, CUNEO'S LABORATORY FOR RADIOLOGY.

(*Centre for Surgery of Bones, Hospital 75, Cannes.*)

JUDGING from the reports of the last French Surgical Congress (Paris, Oct. 4th, 1918), the treatment of pseudarthroses is at present very much to the front. In this highly complex question of the reparation of pseudarthroses radiology can give the surgeon valuable indications—*before intervention*, in order to get an idea of the structure of the bony extremities, of their morphology, and of their mutual relationship; *after intervention*, in order to get an idea of the evolution of the graft, of the bony reparation of the extremities, and, above all, of secondary deviations which could invalidate the primary and immediate results of the operation.

Surgeons know how great the number of pseudarthroses is at present, and how much greater it will be by the huge number of wounded who now decline, but will demand intervention later. Our colleagues at the demobilisation centres estimate the number of wounded now declining any intervention in the case of pseudarthrosis as 8 out of 10. But if it is difficult to ascertain even approximately the number of wounded who will have to be sent to hospital and operated upon later on, one can at least compute the percentage of lesions in the case of wounded sent to the Centre for Surgery of Bones at Cannes. In a first series of 161 wounded, six humeri, five forearms, and four tibias are found to one femur. I would remind my readers that this centre was formed a year ago at the request of my teacher and friend B. Cuneo, *professeur agrégé* in the Medical Faculty of Paris, in order to study, experimentally on animals and clinically on men, the development of grafts in pseudarthroses, the losses of bony substances, and serious lesions in articulation.

The Surgeon and the Radiologist.

Radiology plays such an important part in the study of pseudarthroses that one can say without exaggeration that there are few branches of surgery, recent fractures included, in which the close, constant, coördinated and methodical coöperation of the surgeon and the radiologist is more strictly demanded. To discuss the radiological side of pseudarthroses would therefore be equivalent to going to the bottom of the study of these lesions. Now, at the present time this is not possible, for "not a single chapter of this study can be looked upon as definitely closed" (B. Cuneo). Consequently the present article has no other aim than to show which are the problems set the radiologist by the surgeon and the way in which the former must strive to solve them.

It seems fairly difficult, from the radiological as well as from the clinical point of view, to give a precise definition of pseudarthroses. According to Pl. Mauclaire there is a *pseudarthrosis* when the deviation between the fragments does not exceed 3 cm.; there is *loss of substance* properly so called when there is more than 3 cm. deviation between the bony extremities. The first conception that must be gained in the case of pseudarthrosis is the conception of non-consolidation. Radiological diagnosis between simple retardation of consolidation and definite absence of consolidation is often impossible; it is therefore advisable to perform successive examinations, say one each month. If at the end of several months the extremities of the bones not only do not present any apparent growth, but even seem to be decalcifying and becoming atonic, it is possible, in view of this retrograde process, to discuss the possibility of definite non-consolidation. Moreover, it is well to distinguish *pseudo-losses of substance* by lengthening of the limb amongst *true pseudarthroses* when the bones are in contact from *true losses of substance;* they are easily reducible and have only been ascertained in the case of the humerus.

The Types of Pseudarthrosis.

From the radiological point of view two principal types of pseudarthroses may be distinguished. According to the aspect of the bony extremities, they may be classified into: (1) pseudarthroses where the more or less fine bony extremities, sometimes lanceolate, sometimes regularly transversal, do not present any growth, whether they are in contact or at a distance from each other; (2) pseudarthroses where the bony extremities on the contrary present bony proliferations recalling articular extremities and presenting at first sight a more or less perfect (Obs. 232) and more or less close pseudo-articulation.

Sometimes, when there is a deviation between the two fragments, one may find, when very soft rays are used, traces on the plate of an opaque trail which might be remains of subperiosteal resection for removal of splinters (Obs. 320), for in the huge majority of wounded where the fractured bones have not united splinters have been freely removed, mostly within 48 hours of being wounded. Sometimes the intervention occurs of a fibrous or osteofibrous callus between the two fragments, not sufficiently thick to appear as a shadow projected on the radiograph. This fibrous, invisible callus of slight density may in time and under certain circumstances become progressively ossified; it may be considered as intermediary between a very soft fibrous callus which allows of a certain mobility of the diaphysis, and a bony callus which in time becomes a vicious callus in consequence of secondary deformations at the point of fracture or resection. In fine, all intermediary states between pseudarthrosis in which the fine extremities are not joined by any visible tissue and badly set fractures are found with a more or less soft fibrous tissue or, on the other hand, more or less ossified. In these circumstances it seems impossible to attribute any radiological pathognomonic character to pseudarthroses.

As a result of radiological examinations the arrest of ossification has been noted several times and seems more established. Such a bony extremity which seemed to be putting forth growth halts in its expansion in the articular type; another ends in a transversal shaft or in an oblique spire without proliferation. One would think that the two bones were struck into sterility, with impossibility of forming any conjunction. This phase betrays itself very often on the plates by the closing of the medullary canal, as in amputations. From the radiological point of view it is important to study the medullary canal throughout all its length. One sometimes finds several centimetres from the pseudarthrosis spots where the medullary canal seems closed a second time, as in certain cases of infantile osteomyelitis. (Obs. 46.) In general the bony tissue is less thick and more transparent than usual; it is decalcified. But it is to be borne in mind that even with a normal radiological appearance the bone may be found very pliant, "like cardboard," at the moment of intervention, or actual operative interference. (Obs. 283.)

On the other hand, under a linear aspect, a bone may appear not joined, and another bone may appear to be growing and joined on the plates, whilst intervention shows the contrary. (Obs. 333.) In a case of double pseudarthrosis of the forearm, the radius, which on the radiograph appeared consolidated, proved on intervention to be mobile in a pseudarthrosis of the close type; whilst the ulna, which appeared in linear aspect on the radiograph to be without growth, was found to be quite solid.

Many wounded men have come to the prosthesis centre with osseous fistulas; the radiograph has made it possible to recognise the *splinters*—but without giving assurance whether they were adherent or not—and above all the *sequestra* with their characteristic bell-like shape, bony islets

surrounded by a clear zone. (Obs. 13.) The X rays have permitted the observation of the results of preliminary operations for osteitis, performed before the actual operation of bone-grafting.

Radiological Study of the Deformations and their Reduction.

Some writers have thought that the decalcification or osteoporosis of the extremities in cases of pseudarthrosis might be due to a lesion of the artery nourishing the bone. Examination of the plates enables us to invalidate this opinion, which Pl. Mauclaire had already placed in doubt. Contrary to the opinion of M. Chutro, the best argument lies in the verification of osteoporosis and decalcification at a distance, outside the bone attacked by pseudarthrosis. Observation 71 is typical: there exists a decalcification of the radius, but also of the carpus and metacarpus as marked as of the radius, recalling the appearance of certain tuberculous "rheumatisms." It is certain that lesion of the artery nourishing the radius cannot be made responsible for these lesions. Perhaps the ligatures of the great trunk arteries of the limbs are more important.

The X rays give us information about some certainly rare results of the forms of treatment given to the wounded before their admission to the centre for bony grafts: *Very prolonged immobilisation* or simple *removal of morbid parts*, with the same hopeless state of sterility of the bony extremities, verified by radiography for several months in succession; *bone sutures after such removals* with wires which end either by breaking or by sawing through the bony extremities which they are intended to keep in contact (Obs. 18); *application of metallic plates*, which sometimes produce, on the side opposed to the plate, proliferous osteitis, often of great size (Obs. 500), presenting the appearance of an inflammatory type of osteitis; *application of clasps*, which in spite of their perfect application have not been able to bring about (Obs. 285) any bony proliferation of the extremities; *pegging with ivory or segments of the fibula*, in spite of which the mobility has persisted. (Obs. 320.)

Far more important than the information given as to the structural state is the radiological study of the *deformations of the bone before operation*. Examination by X rays is here of capital importance. Clinical examination alone cannot determine the frontal and lateral correspondences on which the graft is to be made.

It may be laid down as a rule that in all cases where a bone has suffered loss of substance there is produced automatically a frontal deformation and often a deviation from the axis on the part of one or both fragments. It is most important to investigate these deformations in order to correct them as far as possible before intervention. We have here an indication not to put off intervention too long in the case of wounded men; the deformations are the more marked and difficult to reduce the older the cases are. Experience shows that this reduction of deformity cannot always be made at the moment of intervention, even with the powerful forceps of the Heitz-Boyer or B. Cuneo types. As a matter of fact, the deformities would inevitably have a tendency to reproduce themselves, after reduction, accompanied by much loss of blood, under anæsthetics. On the contrary, the facts show that the reduction of bony deformations before operation in pseudarthroses must be slow, gentle, with continuous progressive traction. The devices invented by P. Rolland, head of the laboratory of the Centre for Osseous Prosthesis at Cannes, are based on this idea. But if the general principles are uniform, the application is and must be particular to each case, after examination of the plates. And so X rays are wanted first of all to ascertain the deformations in such a way as to give instructions for constructing the apparatus, then in order to judge of the successive advances of the reduction, and lastly in order to decide on intervention when the maximum reduction has been attained.

FIG. 1.—Deviation of the inferior segment of the radius in consequence of a loss of substance of 10 cm.

FIG. 2.—Progressive reduction of the displacement of the inferior fragment of the radius in Fig. 1 with the aid of a corrective appliance with screws applied to the ulnar side and over the metacarpal bones.

FIG. 3.—Pseudarthrosis of the ulna. The plate shows the deviation of the superior fragment of the ulna towards the radial diaphysis. There is a separation between the radial cupule and the humeral condyle, and there is also a subluxation outwards of the radial cupule.

Prevalent Deformities of Particular Limbs.

It is interesting to note for each limb the deformations most usually ascertained on the plates.

Forearm.—Pseudarthroses of the radius, especially in its middle part, without and still more with loss of substance amounting even to several centimetres, produce a deformation which may be called characteristic. (Obs. 71.) Viewed from the front the inferior radial fragment has a marked inward deviation, and its superior extremity places itself before or behind the ulna. This deformation is sometimes so great that it can be felt on the ulnar edge of the forearm.

(Fig. 1.) There follows an ascension of the radial styloid which, instead of being below the ulnar styloid, reaches the same or even a higher level; there is a projection outwards from the carpal group. Viewed laterally, it sometimes shows on the plate exactly like the back of a fork on the posterior or anterior face of the forearm. However marked these deviations may appear on the radiograph, they are generally reducible by means of the apparatus of P. Rolland. (Fig. 2.) As for the superior fragment of the radius, it is in general less inclined towards the ulna; it is often found in light flexion, and most often in rotation; on the whole, a radius is found in pronation as regards its inferior fragment and in supination as regards the superior fragment. From the radiological point of view it is difficult to estimate the amount of supination of the superior fragment; it is therefore advisable in such cases to take plates of the limb on the healthy side in absolutely pronate and supine positions as well as in intermediate positions, in order to judge by comparison, relying above all on the bicipital tuberosity. (Obs. 407.)

Losses of substance of the ulna may bring about a falling back of the superior humeral fragment, together with a raising of the inferior fragment on the anterior face of the forearm. (Obs. 246.) Laterally there may exist a deviation of the two fragments of the ulna towards the radius, forming the shape of a capital K. (Obs. 401.)

But whether the radius or the ulna be involved, it is important to recognise one fact which is marked at the outset and only accentuated in the sequel—viz., the incurvation of the healthy bone in isolated pseudarthroses of the forearm. Radius curvus is extremely frequent in pseudarthroses of the ulna, and ulna curva in pseudarthroses of the radius. They may be observed even with a minimum loss of substance. (Obs. 317.) The incurvation may be axial, causing the interosseous space to disappear (Obs. 16), or peripheral. In the course of intervention any attempt at reduction is most difficult, if not impossible. Obs. 36 is characteristic on this point:

"Wounded man presenting pseudarthrosis with inward deviation of the radius, in contact with the ulna. After resection of the fragments it is impossible, in spite of all efforts, in the course of the intervention to put the two fragments in direct prolongation of each other."

It must be added that an incurved radius or ulna has a quite natural tendency to become exaggerated in the sequel. Consequently B. Cuneo does not fail to draw attention in the discharge papers of wounded men who have declined intervention to the possible aggravation of the ulterior functional prognosis.

Both in simple pseudarthroses and in double pseudarthroses (Obs. 15, 30) one can observe radio-ulnar synostoses. Always more marked, more extensive, and more dense at the time of intervention than appears on examination of the radiological plates, these synostoses are in themselves causes of superadded deviations.

With all these deformations, exaggerations of pronation and supination, incurvations and synostoses, *reactions on the adjoining articulations* are naturally expected. With regard to the articulation of the wrist all degrees of subluxation may be found; external subluxation pushing the cuneiform and the pisiform within the axis of the ulna and causing the ulnar styloid to rise beneath the skin (Obs. 264)—internal subluxation with the scaphoid and semilunar separated from their facets at the inferior extremity of the radius. (Obs. 100.) With regard to the articulation of the elbow, an external radio-humeral subluxation can be verified. (Obs. 15, 84.) (Fig. 3.) The older the pseudarthroses involved the more frequent and marked are the subluxations.

Upper arm.—Solutions of continuity of the humerus have as corollary a forward flexion of the inferior fragment on the fold of the elbow; the flexion may exceed 45°. (Obs. 66.) This swing of the inferior fragment is also accompanied by an inward or outward twist. It is useful to know this fact in order to interpret the plates, which on a first examination would give the impression of a lesion of the elbow, whilst it is really a matter of a faulty position. On the other hand, it is hard or even impossible to correct this faulty position at the time of taking the radiograph, for this torsion is sometimes accompanied by an ankylosis (at least functional) of the elbow; the olecranon then appears hidden by the epicondyle or the epitrochlea, whilst it ought to appear clearly disengaged below the condyle or the cochlea. (Obs. 31.) This deformation is common in pseudarthroses of the middle third, but especially so in those of the inferior third; it is then often combined with a twist or deviation from the axis of the superior fragment. As to abduction of the superior fragment, it has been verified particularly in pseudarthroses of the superior third.

Thigh.—Two deviations are particularly met with in pseudarthroses of the femur: *abduction of the superior fragment and backward lapse of the inferior fragment.* (Fig. 4.) The abduction takes place in pseudarthroses situated high up (Obs. 135) or pseudarthroses of the lower third. (Obs. 59.) It is progressive and very difficult of reduction, either under chloroform or by means of corrective apparatus before operation. The same is true of the lower fragment; its reduction is very difficult in pre-operative stage.

Leg.—The deformations of the leg recall the usual deformations in fractures: flexion and backward swing of the fragments. Sometimes there is conjoined with it either an attraction of the tibia towards the fibula forming the picture of a capital K, or, on the contrary, a lozenge-shaped ◊ separation. But it is above all important to examine the articular modifications at the level of the knee and the instep. At the knee there may exist either an internal subluxation (Obs. 88), or a marked separation between the external condyle and the external tibial plateau (Obs. 126). At the instep there may be an outward lapse of the astragalus; with regard to the fibula, the tibio-fibular diastasis must be investigated.

The Responsibility of the Radiologist Before and After Intervention.

Such are the bone deformations which may be met with in pseudarthroses before intervention. From the point of view of radiological technique there follows for the radiologist the indication to take a plate of the whole bone segment (diaphysis and epiphyses) and of the nearest articulations. It is very frequently useful to take a plate of all the opposite healthy bone segment in order to judge of the often very small differences in the articular relations. Moreover, the radiologist must strive to place the limb to be radiographed in the most favourable anatomical position. Where this is impossible *stereoscopic radiography* is useful to allow of estimating the relationships of the two fragments to each other and the mutual obliquity of their separation. Finally, in the case of lengthening or shortening of the limb *radioscopic examination* can be useful before intervention, in order to mark on the skin the point corresponding to the pseudarthrosis, so as to permit the surgeon to centralise his incision. In general all plates (from 30/40 to 13/18) are reduced to glass positives 9/12. They are more easy to read as a series, especially with a strong magnifying glass. Stereoscopic plates are reduced to glass positives 45/107, so as to be examined as a series in a Richard's taxiphote.

According to the practice of B. Cuneo intervention consists in taking an inlay from the tibia, of such length and breadth that it can be fixed in the two grooves cut in the superior and inferior fragments of the bone to be grafted. P. Rolland's apparatus made by the firm of Barriquand and Marre, a first model of which has been presented to the Surgical Society by B. Cuneo,[1] allows with the greatest precision of cutting mortises and inlays from an inlay of 21 cm. in length by 15 mm. in breadth placed on a tibia (Obs. 293), to an inlay 3 cm. long and 3 mm. broad placed on a phalanx. (Obs. 319.) The fixation of the inlay in the mortises is performed by means of metallic cables of soft galvanised steel either round the bone or through the bone by means of drilling. In order to be immobilised as rigorously as possible the limb is finally placed either in P. Rolland's appliances of moulded leather or in plaster appliances.

B. Cuneo teaches that in order to obtain a good result there must be intimate contact between the faces of the inlay and the mortises, so as to establish reciprocal penetration of the vessels of the recipient bone into the inlay. But above all things this contact must be very prolonged (nearly a year) and remain as perfectly intimate as possible. Now, after intervention, as the result of hæmatoma or of suppuration in the first days, after cicatrisation following on muscular atrophy in the following months, the volume of the member placed in the containing appliance may vary as

[1] B. Cuneo: Soc. de Chir., June 25th, 1918.

FIG. 4.—Pseudarthrosis of the femur. The superior fragment is in abduction, the inferior in adduction.

FIG. 5.—Osteoperiosteal graft of the radius performed without previous correction. The plate shows the disappearance of the inter-radio-ulnar interosseous space. There is also an ascension of the radial styloid apophysis.

FIG. 6.—Pseudarthrosis of the tibia. Bony graft performed without reduction before intervention. After intervention, in which the reduction was only temporary, progressive post-operative deformation.

2 to 1. Radiological examination is indispensable to know whether the graft has remained in its proper place and in proper contact with the bony extremities. It is advisable to watch it by repeated examinations; the radiograph only allows us to know whether the inlay has really remained in contact. If there is any slight displacement the plates show us in which direction it must be reduced when bringing a fresh appliance into use. Radiological examination is all the more important in the consequences of operations for pseudarthrosis, as two factors may displace the inlay during the phase of cicatrisation—firstly, the prolonged presence of the wires sustaining the inlay; secondly, the tendency of the fragments of the bone to reproduce progressively the same deformations which we have noticed above in the examination of the bone before operation. *With regard to the metal wires* which sustain the inlay, radiography shows us two evolutions of the holes drilled at the time of intervention in order to pass the wires. The hole may either remain the same in size as when first drilled, or it may become enlarged in the proportion of 1 to 3. (Obs. 66.) It is clear that in these conditions of enlargements of the holes, due either to a very slow sawing action of the bone, or perhaps to electrolytic phenomena, the imperfect immobilisation of the inlay as revealed by the plates must be removed by corrective appliances. *As to secondary deformations*, it cannot be repeated too often that limbs affected with pseudarthrosis, even when reduced before intervention, have a tendency to reproduce the ante-operation deformations after intervention. (Figs. 5 and 6.) The same muscular, tendinous, and even cutaneous causes produce the identical results after intervention. It is desirable to watch the deviations in the containing appliances, and even sometimes to apply corrective appliances with continuous, very slow and gentle extension, just as in the attempts at straightening and correction before the operation.

The Technique of Intervention.

The inlay must be maintained in its proper place, directly by metallic wires operating at the point of contact, indirectly by retaining and reducing appliances which operate chiefly to hinder secondary deviations of the bone fragments and to avoid partial or total luxations of the inlay outside of the mortises. Numerous facts have shown the value of this intimate and necessary contact—e.g., the following observation (Obs. 29)—which has all the value of a real experience:—

"Wounded man presenting a fracture of the second metacarpal necessitating excision of four-fifths of the second metacarpal. In spite of subperiosteal ablation no bony regeneration. A third metatarsal was grafted in place of the wanting metacarpal. Intervention took place on account of the non-regeneration and especially of the functional trouble of the index which placed itself faultily under the medius in flexion. Eight months afterwards a radiograph taken from the front shows that the head of the grafted metatarsal, which had at first retained its normal original configuration and structural aspect, has now become completely *atrophied*, has disappeared as to its external radial half and become rarefied and decalcified as to its internal ulnar half. But above all the radiograph of the profile

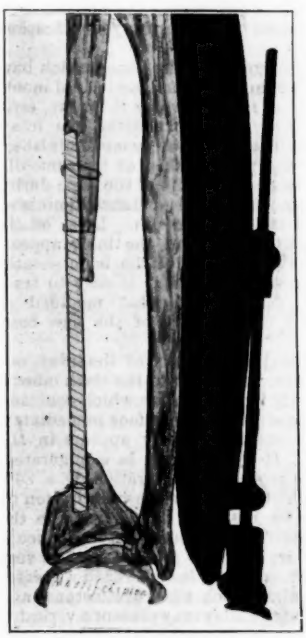


FIG. 7.—Inlay placed on a long loss of substance of the radius after reduction of the inferior fragment before intervention. (Comp. Fig. 2.) As a precaution the reducing apparatus has been left in place after intervention to prevent secondary deplacements.

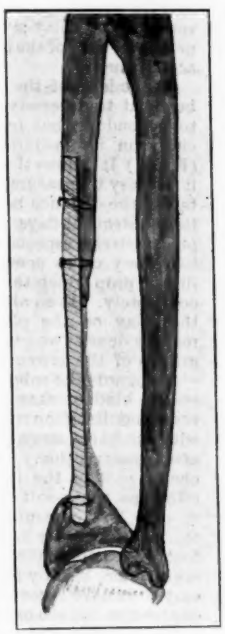


FIG. 8.—Evolution of a graft of 16 cm. placed on a loss of substance of the radius. The inlay is being sheathed progressively by the bony tissue which seems to start from the extremities of the bones on which the inlay has been grafted.

shows that the segment of the metatarsal, resting in a small groove at the base of the metacarpal, is now shifted; the grafted metatarsal is now displaced forwards and outwards in the palm, losing all contact with the stump of the metacarpal.

A second intervention consisted in placing the two bones in contact by means of a metal wire. Successive radiographs have shown that the head of the metatarsal has not only ceased its regressive process, but has also become markedly recalcified."

In this case radiography has shown that a grafted bone atrophies when it has lost its vasculo-nervous contacts with the receiving bone of the graft. But provided that the contacts are re-established, there is not only an arrest of atrophy, but there is also a marked tendency to reparation and recalcification.

As to the inlay, it follows that if the inlay dislocates itself entirely and slips out of the mortises its work on the bony extremities completely ceases. The fact is proved still better in the case when the inlay is dislocated at one of its ends and remains in osseous contact at the other. The first remains sterile and makes a new pseudarthrosis; the second continues in osseous proliferation on the good path of bony reparation of the extremity with which it has remained in contact. (Obs. 18, arm; Obs. 10, leg.) These dislocations are the more important, as they may be accompanied by fracture of the inlay (Obs. 19) at the time when the inlay is passing through a period of atrophy, regression, or softening. Further, to study the typical method of reparation of the extremities of the bone and the evolution of the inlay it is advisable to examine the plates of a case where the inlay has retained intimate contact with the mortises, without secondary deviations of the bony segments, throughout several months. (Fig. 7.) The diagram, issued by B. Cuneo to the Society for Surgery, of the evolution of a graft for loss of substance of the ulna is characteristic. In the first month one may not see any perceptible structural modification on the plates, but in the second or third month one sees two kinds of modification of the inlay. Its two bony extremities in contact with the mortises seem to be lightly atrophied, or, more precisely, appear to be becoming a little decalcified, whilst the middle part of the inlay seems to undergo hypertrophy. It must be noted that the atrophy of the extremities and the hypertrophy of the middle part occupy the medullary zone of the inlay; on the other hand, the cortical subperiosteal zone of the inlay does not undergo any modifications at this time.

At the level of the bony extremities the bones which have been cut transversely appear in the second and third month to be budding out in conical shape towards the inlay, especially on its medullary face, as if to sheathe the inlay. (Fig. 8.) It follows that the intersegmentary zone diminishes; it is easy to measure on the plates (taken at the same distance) the distance between the segments of the bone during the subsequent days and months. This distance diminishes progressively, especially in the fourth month. Later on the two bony cones come into contact, and the inlay appears like a prop which the two extremities of the bone sheathe completely. Even after a year (Obs. 18) it is easy to trace the inlay on the plates, perhaps somewhat modified as regards density and volume, in the midst of the new bony growth of the extremities.

As regards the subperiosteal cortical face of the inlay, one sees a kind of atrophy from the fourth to the sixth month, revealing itself on the plate by a wavy line which contrasts with the linear straightness of this vertical face immediately after intervention. This atrophy usually appears in the centre part of the inlay. If this atrophy is exaggerated, either as the result of too prolonged suppuration (Obs. 246) or of a loss of contact which suppresses vascularisation by tearing the newly formed vessels (Obs. 84), necrosis in the first case and reabsorption in the second may produce a sequestrum, usually lamellar, which is isolated and is very easy to remove secondarily. If these lesions reach a greater degree one can see on the plates such a loss of substance and such a degree of atrophy that the inlay may present a veritable spontaneous fracture. Finally, the entire loss of contact or exaggerated suppuration may end in either complete atrophy of the inlay and its disappearance, or in a state of free foreign body, necessitating excision. (Obs. 167.) It is possible that even with the inlay removed the bony extremities may continue to grow, as if by some osteotropic power (Imbert); the inlay has, by its temporary presence, given some proliferative power to replace sterility.

There remains the reparation of the tibia from which the inlay has been taken. Radiographic series show that the closing up of the bone is radiologically finished between the third and sixth month; by means of palpation it can often be established clinically in advance of radiology.

In Conclusion.

Such is in brief the information which radiology can give in pseudarthroses and their treatment by bony grafts. But in spite of the precision of the structural details and the knowledge about the deviations before intervention, in spite of the information furnished about the evolution of the graft and the reparation of the extremities of the bone, it is necessary to be quite clear that it does not do to ask more from the X rays than they can supply. Radiology may reveal many details, but it cannot reveal them all; once more it is only the complement of clinical observation. With these reservations it must also be borne in mind that in order to obtain the maximum of precision the plates must be examined long and often; they must be compared with each other and with cases already operated upon; in a word, a reasoned diagnosis of a radiograph must be made, bearing in mind the causes of error, deformations of the plates and superadded invisible elements. Understood in this way radiology seems to be a valuable auxiliary in the surgical treatment of pseudarthroses. As such B. Cuneo has studied it with all the authority which attaches to his work.

The French Supplement to THE LANCET—under the Editorial Direction of Professor Charles Achard, Professor of Pathology and Therapeutics in the University of Paris; and Dr. Charles Flandin, D.S.O., Médecin-Major de 2me Classe, Chef de Clinique à la Faculté de Paris—has appeared on the dates given in the following list, which sets out the titles and authors of the contributions:—

Sept. 21st, 1918: (1) The Microbic Diversity of the Enteric Fevers, by Professor Achard. (2) Post-Typhoid Atony of the Cæcum, by Maurice Loeper, Professor of the Faculty of Medicine and Physician to the Paris Hospitals.

Oct. 19th, 1918: (1) What the War has Taught Us about Tetanus, by Louis Bazy. (2) Tetanus Consecutive to Superficial Wounds and to Trench Foot: Treatment and Prevention, by Professor Raymond, Médecin Principal de 2me Classe.

Nov. 30th, 1918: (1) General Review of French Cardio-Pathology during the War, by Ch. Laubry, Physician to the Paris Hospitals, Médecin Major de 2me Classe. (2) Methods of Estimating Augmentation in Depth of Volume of Left Ventricle, by Dr. Bordet, Director of the Radiological Laboratory of the Centre of Cardiology of Professor Vaquez, Hôpital St. Antoine.

Jan. 11th, 1919: (1) Gunshot Concussion of the Spinal Cord, by Henri Claude, Professor in the Paris Faculty of Medicine, Physician to the Paris Hospitals; and Jean Lhermitte, formerly Chef de Clinique in the Paris Faculty of Medicine. (2) Contribution to the Study of the Manifestations of Emotional Shock on the Battlefield, by Cl. Vincent, Physician to the Paris Hospitals, formerly Medical Officer to the 46th and 98th R.I. and to the 44th B.C.P.

March 1st, 1919: The Surgical Complications following Exanthematic Typhus, by Dr. Paul Moure and Dr. Etienne Sorrel, Prosectors to the Faculty of Medicine, Paris, Médecins Aide-Majors de 1er Classe, Surgeons to the French Hospital at Jassy.

April 5th, 1919: (1) Nervous Complications of Exanthematic Typhus, by A. Devaux, formerly Interne of the Paris Hospitals, Médecin-Major de 2me Classe. (2) Note on the Epidemic Diseases Observed in Rumania during the Campaign of 1916–17, by Dr. Henri Vuillet, late Interne of the Paris Hospitals.

May 3rd, 1919: (1) Malaria During the War, by G. Paisseau, Médecin-Major de 2me Classe. (2) Distribution of Soldiers, Temporarily Unfit through Malaria, in Agricultural Colonies, by Professor E. Jeanselme. (3) Studies on Renal Function in Chronic Nephritis, thesis by Pasteur Vallery-Radot, reviewed by Professor Charles Achard.

June 21st, 1919: (1) Recent Work on Cerebro-spinal Fever, by C. Doptər, Professor, Val-de-Grâce, Médecin-Chef to an Infantry Division. (2) Meningococcal Rheumatism and Arthritis, by Dr. Paul Sainton, Physician to the Paris Hospitals.

THE LANCET can be ordered through any Library in France, or through the following special agents:—

PARIS.—MASSON ET CIE, 120, Boulevard St. Germain.
EMILE BOUGAULT, 48, Rue des Écoles.
CH. BOULANGÉ, 14, Rue de l'Ancienne Comédie.
FELIX ALCAN, 108, Boulevard St. Germain.
M. CHOISNET, 30, Rue des St. Pères.
H. LE SOUDIER, 174, Boulevard St. Germain.
MALOINE ET FILS, 27, Rue de l'Ecole de Médecine.
VIGOT FRÈRES, 23, Rue de l'Ecole de Médecine.
MARSEILLES.—TACUSSEL AND LOMBARD, 54, Rue Paradis.
TOULOUSE.—EDOUARD PRIVAT, 14, Rue des Arts.

THE LANCET.

LONDON: SATURDAY, AUGUST 23, 1919.

Small-Pox on the Continent.

THE recent increased incidence of small-pox on the continent of Europe is likely to give rise to some uneasiness among those who are acquainted with the comparatively unprotected state of a large section of our population against the onset of this dangerous and infectious disease. The present circumstances, as we have on previous occasions pointed out, are entirely favourable to the spread of small-pox to our shores. Hundreds of thousands of soldiers are returning from the various war zones, in some of which small-pox has lately been occurring, and the pent-up trade and shipping, so long restrained by the war, are now being let loose and bringing many passenger ships and cargo boats to British ports from the Mediterranean littoral, the Baltic, and the Black Sea, in all of which regions small-pox was recently, or still is, occurring in epidemic form. A brief outline of the incidence of small-pox on the continent during the first half of the present year, so far, at least, as information is available, may help the reader to gauge the extent of the danger already threatening this country—a danger which in the late autumn may, in our opinion, become still more acute and menacing.

Up to the middle of June 2586 small-pox cases had been notified in Germany, of which 734 were referred to the city of Dresden, which lies not very far from the borders of Austria. The disease has also been occurring at several ports along the German shores of the Baltic, including Danzig, Stettin, Sweinemünde, and Königsberg. In the interior outbreaks were reported in several cities, among which were Berlin, Baden-Baden, Aachen, Leipzig, Frankfort, and Hanover. At the last-named town the outbreak began in a camp in which Russian prisoners of war were interned. Previous to the war Germany occupied a high position as regards its vaccination and revaccination, and its resulting comparative immunity from the ravages of small-pox, notwithstanding frequent importations of the infection from Russia and Austria. The withdrawal for war service of many medical practitioners in Germany from practice and from public appointments, including that of public vaccinator, no doubt served to upset the routine arrangements for vaccination and revaccination. Another factor favouring recent small-pox in Germany has been the presence of large numbers of unvaccinated Russian prisoners of war, whom, even after the cessation of hostilities, it was impossible to repatriate. Very little information has come to hand from Austria, but small-pox is known to have been recently prevalent in Vienna, Prague, and other places. At Budapest, the Hungarian capital, there has been a sharp outbreak of the disease. Italy of late has been, and still is, suffering from a widespread epidemic of small-pox. In the seven weeks' period ended July 6th 4645 cases of the disease were reported. During the month of June small-pox occurred at some Italian ports, including Bisceglia with 232 cases and Taranto 335 cases, both ports being situated on the Adriatic coast of the province of Bari. At the Sicilian port of Trapani 230 cases were notified during the month. Outbreaks also occurred at a number of towns, including Naples and Pagani. In Greece small-pox has been prevalent at Salonica, where 42 deaths have been certified from it; cases have also been occurring at the port of Cavalla and on the island of Corfu. There has been a recent epidemic of small-pox in Roumania, and in the four weeks ended July 15th 1595 cases were reported with 553 deaths, giving the high fatality rate of 34·6 per cent. The disease was also present at Bucharest and Jassy, as well as at the ports of Galatz, Braila, and Constanza.

Owing to the Bolshevist regime in Russia little information is allowed to pass over the frontier as to the incidence of infectious diseases. It is, however, a well-known fact that for many years small-pox has been more prevalent in Russia than in any other European country. With the suppression of sanitary administration and the disregard of scientific advice by those now exercising power in various parts of Russia, small-pox has become more prevalent at the present than in the past. Indirectly we have heard that the hæmorrhagic form of small-pox, notoriously attended with great mortality, is epidemic in the town of Simbirsk, which lies about 400 miles east of Moscow. In Southern Russia outbreaks have occurred at Ekaterinodar, in the province of Kuban, and at the Black Sea port of Novorossick, some 90 kilometres from Ekaterinodar. Small-pox is at present epidemic in Finland, and during the first three months of this year 778 cases were recorded, 372 of which occurred in the province of Viborg, which adjoins the Russian Government District of Petrograd. In Sweden small-pox has appeared at Stockholm and also in Denmark at Copenhagen. The disease, though not in large amount, has been reported to be present in Belgium during each of the first five months of 1919. There have been recent outbreaks of small-pox in France, and among the places invaded were Paris, Toulon, Brest, and Havre. Spain frequently suffers from epidemic small-pox, and in the present year some of the large towns were affected; in Madrid, for example, 81 deaths from this cause were reported during the first quarter, and outbreaks also occurred in the Spanish ports of Cadiz, Barcelona, and Valencia; at the last-named port 568 cases were recorded in the first three months of 1919. The disease had been epidemic in Portugal towards the end of 1918, and this continued during the first half of the present year, 160 cases being reported at Oporto and 116 at Lisbon. Little information has come to hand from Turkey, but indirectly we hear of small-pox having occurred recently in Constantinople, as well as in some places in Western Anatolia. In addition, as the voyage to England from Egypt can be done in less time than is represented by the incubation period of small-pox, there is a possibility of the infection being introduced into our own country from this source before the disease can be recognised. Up to the beginning of June close upon 3000 small-pox cases had been recorded in Egypt, and of these 500 occurred in the fortnight ended June 10th.

It is probable that if the pre-war sources of information had been available now the above details of the small-pox incidence would have been greatly extended. But the figures we have given will suffice to show that many countries in Europe are now suffering from small-pox, and that a

number of ports in the Mediterranean and along the Atlantic shores of Europe, as well as in the Baltic and Black Seas, are infected by small-pox, and therefore possible sources of infection for this country. Meanwhile, the disregard in England of vaccination and revaccination continues as before, and the unprotected proportion of the people increases day by day. In THE LANCET of Aug. 16th Dr. W. MCCONNEL WANKLYN, a recognised authority, gave some useful notes on small-pox for the assistance of general practitioners. He directed attention to the numerous outbreaks of the disease which have occurred this year in England and Wales, due in some instances to imported infection. He emphasised the importance of a correct diagnosis, missed diagnosis being a frequent source of the spread of the disease. In the same issue we reproduced a memorandum recently sent out by the Ministry of Health on "The Public Supply of Vaccine Lymph," explaining how lymph may be obtained without delay, by those medical officers who are called upon to deal with local small-pox cases, for the vaccination or re-vaccination of contacts and other persons in the invaded locality. This memorandum is timely, and will prove of service to those concerned. As we have already stated, the small-pox danger is more likely to become acute in this country in the latter months of the year.

Food Preservation in Relation to Accessory Factors.

THE busy and fruitful researches which are being carried on at the present time in regard to the kind and degree of accessory factors in the common dietary are rapidly suggesting that our methods of food preservation in some directions need revision. For example, it is shown that the value of canned vegetables in regard to antiscurvy and growth-promoting properties is negligible. That, at all events, is the purport of an investigation which we publish this week by Dr. MABEL E. D. CAMPBELL and Dr. HARRIETTE CHICK. It is here shown that in the case of runner beans the antiscorbutic value of 20 g. was reduced by canning to less than that of 5 g., and was not superior to 1·5 or 2·5 raw beans. In other words, this preserving process means that 75 to 90 per cent. of the antiscorbutic value had been destroyed. In the case of cabbage the loss is estimated at about 70 per cent. of the original value. This loss is attributed to the destruction of antiscurvy factors occurring during the heating involved in the process of canning, and a further loss occurs during the period of storage. In the case of green leaf vegetables possessing in addition to the antiscurvy vitamine the growth-promoting accessory factor, this was also lacking in the canned material, but was present in the liquor. It would seem undesirable, however, to take the liquor on the ground conceivably that it might be contaminated with metal, though this difficulty may be got over by lacquering the tins, as is done in some cases, or coating them lightly with an innocuous varnish. The results in regard to the deterioration in canned vegetables in growth-promoting and antiscurvy factors are strikingly brought out in a table. In the majority of instances the process of canning reduced the protective power against scurvy to a negligible quantity and the growth-promoting properties were likewise much diminished. The well-known method of preserving vegetables by brine and vinegar is not referred to; nowhere in these important researches do we find pickles mentioned. It would be interesting to have determined whether the activities of the food accessory factors in vegetables preserved in salt and vinegar are disturbed. The investigation should of course include walnut, cabbage, onion, beetroot, all of which, in their fresh state, are protective against scurvy. In the records previously published[1] pickles appear to have been disregarded. Admirable additions to certain foods, it would be interesting to discover whether they fill a gap also by supplying accessory food factors. If so, there is greater reason for consuming them than on the mere ground of condimental value. Pickled vegetables, of course, may well be distasteful to the animals selected for the experiments, but this technical difficulty occurred in the investigation of dried fruits, when it was overcome by making decoctions, the liquor obtained being administered to the animals by means of a syringe. The same procedure, perhaps, could be adopted with pickles, and an evaluation of antiscorbutic and growth-promoting principles obtained.

In a second contribution by Dr. HARRIETTE CHICK, Miss E. MARGARET HUME, and Miss RUTH F. SKELTON on the Antiscorbutic Value of some Indian Dried Fruits it is shown that the dry tamarind, cocum, and mango possess a definite but small antiscorbutic value. This value is greatly inferior to that possessed by raw cabbages, swedes, germinated pulses, orange juice, lemon juice, but equal or superior to that of carrots, beetroots, cooked potatoes, raw meat juice, reckoned weight for weight in the natural conditions. This investigation was undertaken early in 1917, at a period in the war when scurvy was proving a serious menace to our native troops in Asia. In the Afghan Boundary Commission in 1884–1886 it was observed by Major-General Sir HAVELOCK CHARLES that a freedom from scurvy was enjoyed by the native soldiers who consumed dried mango when fresh fruits or vegetables were not procurable, and these investigations show that the dried mango is to some extent protective, but with nothing like the power of fresh fruit or their juices.

Some valuable observations, again, occur in a third contribution on the subject by Miss ROSAMUND E. BARNES and Miss E. MARGARET HUME, who have in their investigation set out an interesting comparison between the antiscorbutic properties of fresh, heated, and dried cow's milk, the subjects of these nutritional experiments being guinea-pigs and monkeys. The dried milk used was prepared by a process involving the use of a high temperature, which, amongst other things, destroys enzymes, coagulates albumin, and separates fat. It would be well before deciding upon the position of dried milk to examine the milk powder obtained by the spray process, which, being conducted at a relatively low temperature, may possibly secure the retention of antiscorbutic principles. If so, an important differentiation between these methods of drying may be established. At the outset cow's milk, even when fresh, proved to be a foodstuff comparatively poor in antiscorbutic properties. Dried milk was still less protective, and "scalded" milk was superior to it. This observation bears, of course, upon the practice of just boiling milk and setting it to cool rapidly before giving it to infants. Apparently, however, raw milk varies in its accessory food factor value according to whether the cow has received a winter dietary (hay, roots, oil-

[1] THE LANCET, July 5th, 1919, p. 23.

cake, and cereals), or the early summer dietary of fresh grass from the open pasture. In other words, the great increase of antiscorbutic material in the latter diet resulted in a corresponding increase in the antiscorbutic value of the milk given. It is true that these observations are not based on experiments on the human subject, and as Mr. E. A. BARTON points out in a letter published in another column, there seems to be no doubt that animals suffer from the deprivation of the antiscorbutic vitamine in their food much more rapidly and severely that does the human infant. It is to be remembered that the animal diet in the main is raw and growing food. Whether the human mother is able to transmit a tolerance in her infant to a diet poor in vitamines, or whether the human young require much less than other animals to keep them in health is, as Mr. BARTON points out, pure speculation; but there is a probability that when infantile scurvy has advanced to the stage of physical signs we have arrived at the last chapter of the disease and not the first. A valuable region of study in dietetics is being opened up by these investigations.

Unqualified Treatment of Venereal Disease.

AT the London Sessions recently two men, J. SHADFORTH and J. WILSON, were convicted and sentenced to imprisonment in the second division for four and three months respectively, for offences against the Venereal Diseases Act, 1917. The Act, it will be remembered, forbids the treatment of venereal disease by persons who are not qualified medical practitioners, in areas in which the Act is adopted and in which gratuitous treatment for such disease is provided. The Act also forbids the advertisement of treatment and alleged remedies for venereal disease. The defendants were described as "chemists," engaged in a business conducted under the name of Shadforth's Prescription Service, Ltd. SHADFORTH called himself the "governing director," and stated that he employed a staff of 50 persons. The nature of the business transacted by "a prescription service" is probably indicated by its name and by the fact that SHADFORTH advertised in a daily newspaper a variety of alleged medicines for the treatment of disease, including one described as prescription 606, with a recommendation of it as a "bad blood tonic." In a pamphlet, the purchase of which was recommended by the same advertisement, occurred the passage "even syphilis in most instances can be cured by the patient himself, with practically no supervision, provided he is told at the outset in plain English what to do and what remedy to take." At SHADFORTH'S shop detectives were able to purchase tablets purporting to be those advertised as 606, and one of them was told by WILSON that it was the best he could have for syphilis. As to the tablets being advertised for bad blood without mentioning syphilis, WILSON explained: "Well, we could not put that in, could we?" As a point of law it was submitted that the section of the Act involved referred to actual dealing with a person affected by venereal disease, and that there was no evidence of treatment, prescription, or the giving of advice. Mr. LAURIE, the deputy chairman, however, declined to withdraw the case from the jury, with the result recorded above. The verdict followed after SHADFORTH had himself gone into the witness-box and had stated with considerable candour that he had done his utmost to oppose the passing of the Venereal Diseases Act, 1917, by writing letters to Members of Parliament, and even by standing himself as an independent candidate for election to the House of Commons. Since the Act became law he had written to every Member of Parliament to inform him that he intended to defy the Act, but he alleged that he had since changed his attitude and had decided to comply with the law, although continuing to protest. He denied that he had advertised "606" with any intention that it should be taken to have any relation to salvarsan, and said he had forbidden his assistants to sell remedies for venereal disease. He admitted, however, that in a letter to Sir EDWIN CORNWALL he had written, "For many years I have openly, honourably, lawfully, and successfully supplied the remedies and treatment for venereal diseases."

The result of this prosecution is one upon which the public and those concerned in the passing of the Venereal Diseases Act, 1917, are to be congratulated; the case shows "Shadforth's Prescription Service, Ltd.," to be one of those institutions conducted for profit, and no doubt with considerable profit, the activities of which are dangerous to sufferers from venereal disease, and so to the public. SHADFORTH said in the witness-box that he had made a special study of venereal diseases. No doubt he had, from his point of view. If he had studied them from the point of view of the medical profession, however, he would have recognised willingly that syphilis and gonorrhœa and their complications cannot, consistently with the welfare of the patient, be dealt with by a shop assistant selling tablets over a counter, or posting them, to one who applies for them in response to an ingenious advertisement. We are writing of particular diseases for sufferers from which a limited form of protection has tardily been provided by Parliament. Our view and that of the medical profession is, however, without any qualification, that whatever may or may not be the matter with the patient, he cannot be treated properly, and he ought not to be treated at all, by an unqualified person, who sells him a nostrum for profit in response to his statement that he is suffering from ——. He may name any disease from which he fancies that his symptoms proceed, and, indeed, he may name it correctly, but a physician before prescribing for him would require to know more about his condition than that. Diagnosis is not as simple a matter as the labelling of the bottles and pill-boxes that the quack sells. Of course, in trifling cases, or where the patient has nothing the matter with him, the credulous purchaser may suffer only in his pocket. He may be sold something which, if costly, is quite harmless; but even then he is likely to acquire a habit of self-treatment that may one day prove his undoing. All this is quite well known to the medical profession, but we comment on the case because these are the sort of incidents that our readers ought to bear in mind when advocating firmer legislation in the repression of quackery.

INDEX TO THE LANCET.
(VOL. I., 1919.)

WILL those subscribers who have written to the Manager asking for copies of this Index kindly note that it was given in the issue of THE LANCET of July 5th and is not printed separately, thus reverting to pre-war custom?

Annotations.

"Ne quid nimis."

"THE OSLER MEDICAL LIBRARY."

A DISTINGUISHED foreign physician attended the recent Osler presentation ceremony at the Royal Society of Medicine, fully believing that the undergraduates from the University of Oxford would be present in swarms and that the occasion would be marked by noisy demonstrations in honour of a great teacher. He was not so much disappointed as puzzled by what actually happened. No noisy students were present and the proceedings were simple, dignified, and not unmarked by a touch of pathos in Sir William Osler's charming and characteristic reply to Sir Clifford Allbutt, after the latter had handed him the Birthday Book. Sir John MacAlister struck a right note in the chorus that greets the Regius Professor of Medicine at Oxford on the occasion of his seventieth birthday. This contribution to the Osler Birthday Book is a brilliant essay in Utopianism. Sir John MacAlister dreams a dream and imagines himself the guest of the librarian of an ideal Osler Medical Library, situated in Regent's Park. It is a palace with a Greek portico, and in the centre of the great inner quadrangle stands a noble marble statue, which at first the dreamer mistakes for the "Hope Asklepios," but soon recognises as a living, smiling William Osler. "I could have sworn," he says in ecstasy, "that one of those wonderful eyes solemnly winked at me." The wink gives the cue to the further experiences inside the remarkable building which contains a magnificent collection of books, besides printing presses, a bindery or binding-room, telephones galore, and a system of pneumatic tubes so designed as to drop volumes at the proper instant of time in front of the pampered researchers at their desks in the large main library. These tubes manifestly do the work of the grey matter in the brain: they are the thinking machine of the ideal library. Librarians are there, it is true, but we feel from the first that these persons are only a kind of mechanics or tradesmen of books, however much they may be renowned as specialists in particular branches of medical and surgical learning. The poor fellows, harassed at all hours of the working day by telephone calls, will take their meals together in a refectory and talk shop there to the ruin of their digestions and of general conversation. The noble library is very nearly dust-free, and apart from its wealth and variety, this is the best thing a library can be. The grand aim of a librarian in his house-keeping capacity should be the complete deportation of dust from his precincts, but in too many cases dusting of books only creates a local dun-coloured cloud which re-settles in the old situations. In the "Osler Medical Library" dust is removed from the volumes by damp clean sawdust which is sprinkled on their top edges: this gathers up the book-dust to be swept off the floor clinging to the particles of sawdust. In a dream the process is fine, but is it not a little perilous? Damp sawdust is difficult to regulate. If a little too wet it cakes and exudes small drops of water, which would be fatal to fine bindings. "Pulvo," fitted with the proper shape of nozzle, is the advice of our own dreamer of the model library. But Sir John MacAlister need not be taught any lessons about "pulvo," though we should like to learn if he has any criticisms to offer, for his article is full of practical suggestions. All he tells us about the manner in which an ideal library should be catalogued is admirable, and we are glad to know that this dream-system is already virtually in use in some of the great scientific libraries. Admirable, too, is his suggestion that the records of research in the shape of literatures and bibliographies made by medical authors should be preserved by librarians. At his own library this, we believe, has been done for some years, while at the library of the Royal College of Surgeons of England Mr. Victor Plarr has catalogued all bibliographies and literatures in the printed books under his charge. This catalogue of bibliographies is a large one and has proved most useful to researchers, among others to Sir William Osler.

ALCOHOL IN A NEW RÔLE.

THERE are some points of medical interest in the proposal to bring alcohol into prominence as a source of power. Incidentally the moment that facilities are given for its production on a large and economic scale its application would not be limited to traction and like purposes, for cheap alcohol would give an immense stimulus to many industries dependent upon it as a solvent. Alcohol for general industrial purposes, however, must be made undrinkable. The de-naturing of alcohol so that it shall be made unfit for consumption offers no difficulty, though, of course, precaution must be taken that the altered alcohol cannot be again purified and used as potable. At present the process of rendering industrial alcohol undrinkable adds materially to its cost, but recent inquiries have shown that the price of the deterrents can be considerably reduced, and our legislators could further help in this matter by imposing much heavier penalties than those now sanctioned by law for evasion of the spirits duty in any case of illicit purification of "power" alcohol to render it potable. The question is of undoubted importance, when it can be shown that although the United Kingdom may be unable to supply enough raw material to make the manufacture of "power" alcohol a commercial success, the resources of its dominions in this regard are potentially very great. The vegetable sources in the British Islands afford but a poor stock of material for the manufacture of alcohol. But in this matter the Empire could come to our aid most effectively with its vast carbohydrate productive capacity. Apart, however, from that great asset, chemists have recently turned their attention to the possibility of producing alcohol synthetically, and the results are so far promising. The starting point is coal gas or coke-oven gas, which contains a small though not negligible amount of ethylene. This can be removed by charcoal without disturbing materially the quality of the gas. The charcoal then is immersed in molten lead, which drives out the gas, which, as most students of chemistry know, was the basis of the synthesis of alcohol many years ago. That this process should be advanced beyond its stage of flask and still in the laboratory, and become a commercial proposition to-day, is a matter of some wonder even to the chemist himself. In many text-books will be found the statement that these reactions are of considerable theoretical importance, but now we are told it has been demonstrated that our gas-works are capable of yielding annually 150 million gallons of 90 per cent.

alcohol by this synthetic process, which has been proved to be commercially workable. Ethylene (C_2H_4) is absorbed by sulphuric acid to form ethyl hydrogen sulphate. This, boiled with water, yields alcohol and sulphuric acid again. Distillation completes the process. The catalyst, that mysterious third party in chemical reactions, has been made to intervene, and the yield of alcohol then becomes greater than of "theoretical importance." Alcohol will play an entirely new rôle in our industrial and domestic affairs if these things be true.

A REMINISCENCE OF WILLIAM HUNTER.

Dr. Alexander Napier, the honorary librarian of the Royal Faculty of Physicians and Surgeons of Glasgow, has published in the *Glasgow Medical Journal* for July an interesting note concerning William Hunter. Dr. Napier numbers among his friends a certain Mrs. Kean, whose family is connected with the Hunters through Archibald Hunter, an uncle of William and John, and from a grandson of this Archibald Hunter, another William Hunter, she received the relics which form the subject of the memorial. They are a letter and a portrait. The letter, dated Windmill-street, March 20th, 1782, is written to one Robert Barclay, evidently in response to one from him asking Hunter to intercede with the Queen on behalf of a seaman who had been condemned to death. Hunter refused on very sound reasoning. The other relic, the portrait, is a copy of a stipple engraving by Thornthwaite, and is well reproduced in Dr. Napier's paper. It shows, as Dr. Napier remarks, a different type of face from the better known portraits, which are characterised by elegance and grace. The Thornthwaite portrait is that of a masterful and determined man.

DENTAL TREATMENT AND NATIONAL HEALTH.

IN the report issued by the Departmental Committee on the Dentists Act attention has been drawn to the necessity of enlightening the public by every possible means as to the need for conservative treatment of diseased teeth. A committee of the British Dental Association has recently considered how this could best be carried out, and has embodied its views in a pamphlet which, we believe, has been circulated amongst education and public authorities. The committee, after due deliberation, are of the opinion that it is impossible, owing to the present condition of the dental profession, to formulate an extensive system of State dental service, and consider that, in the first place, every endeavour should be made to obtain a complete school dental service. For the latter purpose they recommend, as a rule, whole-time officers, and are of the opinion that on the staffs of the Educational Departments of England and Scotland there should be dental officers responsible for the work done in local educational areas. For the treatment of expectant mothers and of children under school age they suggest, if possible, the appointment of whole-time dental officers, and the institution, where possible, of central laboratories for the provision of dentures. The requirements of the adult population, they think, might for the present be met by an extension of the system of factory clinics, by affording support to the public dental services established by members of the profession, and by the creation in certain large industrial areas of experimental clinics. The report shows very clearly the difficulties of providing an adequate service for the whole community. It quite rightly emphasises the desirability of treating children of school age, but we consider that, important as this is, there is a greater need to deal with those under school age, for in the children of the masses irretrievable damage has often been done to the teeth before school age. A feasible plan would, we think, be to co-ordinate the work of the children's welfare committees with that of the school authorities, and make it possible for those under school age to be treated by the school dental officers. In reading the report we feel that by no means sufficient consideration has been given to the question of prevention. If we are to obtain an improvement in the condition of the teeth of the nation, it will be by teaching the individual to prevent the condition and not to rely upon a cure. One trouble is the indifference of the majority to the question of dental disease, and this can only be overcome by widespread propaganda on the harm which arises therefrom. The establishment of free public lectures and the issue of a small pamphlet written in popular language would prove of inestimable value. By this means the amount of disease would be considerably lessened and there would be a corresponding diminution in the amount of conservative dentistry required.

THE METROPOLITAN HOSPITAL SUNDAY FUND.

AT a recent meeting of the Council of the Metropolitan Hospital Sunday Fund the Distribution Committee reported that the total amount of the Fund on August 11th would amount to £83,000, of which it recommended the distribution of £82,462 13*s* 8*d*. The amount will strike many as large, having regard to the financial situation produced by the war. Others will compare it with far smaller sums which were regarded as satisfactory totals not many years ago. If, however, we contrast its purchasing power with that of a sum of £50,000 or £40,000 before the war we realise that, generous though the public may have been in subscribing, the hospitals will receive allotments small in value by comparison with those of the past. Hospitals have been hardened to rigorous economy, but their need for it has become even greater in an epoch when science has increased their powers of usefulness and when the ravages of war have augmented the number of patients likely to crave their aid. It is a recognised function of the Metropolitan Hospital Sunday Fund to promote economy of management, and a timely recommendation of the Distribution Committee suggests that in some cases where two or three cottage hospitals are within a reasonable distance of one another they should be recommended to amalgamate with a view to more economical working. The Committee points out that the relatively small proportion of occupied beds appears to account for the high cost of treatment shown at some cottage hospitals. The recommendation is in all the circumstances a sound one. The sums allotted to individual cottage hospitals amount in some instances to between £100 and £200, the smallest being under £20. These are not large amounts for the supporters of a cottage hospital to make up if they should prefer to retain as exclusively local an institution of which they are naturally and justly proud. They might then reject with a clearer conscience the advice of the Distribution Committee, and refuse amalgamation, although the resulting economy

would mean obtaining the best possible result for their money. Apart from such voluntary renunciation, the Distribution Committee has, of course, the right to refuse to allocate money where it is not satisfied that economy is practised.

"THE DANGERS OF THE NEW PUBLIC HEALTH ACT."

UNDER the above heading appears an article in the July number of a well-known Roman Catholic organ, *The Month*, which shows the apprehension with which legislation, apparently good in itself, excites among a large section of our fellow-citizens. The writer takes exception to the new Act (its proper title is the "Ministry of Health Act, 1919,") on two main grounds, namely:—"A. The respects in which this Act is liable to abuse through administrative action (1) on account of, perhaps, accidental vagueness in the text, or (2) on account of phrasing apparently designed to admit of large modifications in administration. B. The actual violations contained therein of (1) general first principles, and (2) definite and precise Catholic doctrine." We are in sympathy with the writer in *The Month* as to the provision made for legislation by Orders in Council, a procedure of which we have seen far too much during the war, but he is in error when he says that provision for legislation of this character is made in "no less than seven of the 11 clauses of the Act." As a matter of fact Orders in Council are only mentioned in three of the 11 clauses—namely, Clauses 3, 4, and 8—though in fairness we must allow that provisions for Orders in Council in Clause 3 are very wide-spreading. As regards objection B, we think he is somewhat in the mental condition of those who worry about crossing the river before they come to the bridge, and we doubt whether the views of extreme "Eugenists" will affect the working of the Act as much as he fears. Anyway, we recommend him to reconsider his judgment until the appearance of the Medical Services Bill. With regard to the question of "birth control," upon which he lays special stress, we recommend to his attention a work by his co-religionist, Dr. C. Capellman, seventh edition, 1890, entitled, "Medicina Pastoralis."

COMMON LANDS AND MEDICAL USAGE.

DOUBTS are being expressed by the press and members of the public as to the effect upon common lands which may be produced by the provisions of the Land Settlement (Facilities) Bill now before Parliament. Lord Eversley, in a letter recently published in *The Times*, pointed out that although various safeguarding amendments proposed by the Commons Preservation Society have been accepted by the Board of Agriculture, whereby no part of a common or open space vested in a local authority can be alienated without Parliamentary sanction, and no rural or suburban common without the consent of the Board of Agriculture, yet the reclamation schemes included in the Bill constitute a real and serious menace. For the schemes will be initiated by a department of the Board itself, and there will be no appeal from any decision of the Board to acquire and enclose a common. We are glad to know that local authorities must obtain the consent of Parliament to alienate a common, for in past times local authorities have not hesitated to get hold of common land for use as the site of a cemetery, a sewage farm, or an isolation hospital. It is true that all three institutions are necessities of modern civilisation, and are all abominations in a thickly populated district; but there is plenty of practically barren land in private ownership which should be taken up before common lands are alienated, either with a view to their being turned into cultivated land or used as building sites. There is no clause in the Bill providing that the land shall be restored as common if cultivation proves unsuccessful, and this, surely, is an error. Much common land was put under cultivation with very good results during the war, but then the circumstances were such as to make the experiment likely to succeed. For instance, some 30 or 40 acres of Ashdown Forest were put under cultivation by the military of a large camp. Two essentials of successful cultivation were present—namely, labour and manure—and magnificent crops were grown. The land is too far away from the neighbouring village to serve as allotments and the conservators of the forest have insisted on the land going back to its original condition now that the camp is practically broken up. They have arguments on their side, though they may not be irrefutable. Commons and forest lands are of the greatest importance to the welfare of the community not only as "open spaces" but as pasturage, and sources of litter—e.g., heather and bracken. They are sanctuaries for insect-eating birds, which are of enormous value to agriculture, for every crop is not as assailable as a cherry, nor every bird as mischievous as a bullfinch. So long as other land can be obtained of equal suitability, commons should be exempt from alienation, and economy in purchase is a secondary consideration. But where it is a question between public health and pleasant amenities public health must be allowed to win.

THE RAISING OF THE INCOME FOR COMPULSORY INSURANCE.

THE attention of employers is being called by the Ministry of Health to the fact that by the National Health Insurance Act, 1919, which has just received the Royal Assent, the limit of remuneration up to which persons employed otherwise than by way of manual labour are liable to compulsory health insurance has been raised from £160 to £250 a year. Employers are required for the future to pay health insurance contributions in respect of persons employed by them under a contract of service as follows: for non-manual workers, where the rate of remuneration (including any regular bonus, &c.) does not exceed £250 a year; for manual workers, irrespective of the rate of remuneration. A non-manual worker whose remuneration is over £160 a year but not over £250 a year may, within a limited period and under certain conditions, claim a certificate of exemption, and on the grant of such a certificate the employer's contributions (3*d.* a week) are alone payable. Forms of application for exemption will be obtainable shortly at any post office.

ST. THOMAS'S HOSPITAL, LONDON.—The following scholarships have been awarded: Entrance Science Scholarships, 1919-20: 1st, £150, T. V. Pearce; 2nd, £60, E. G. L. Walker; Arts Scholarship, £15 15*s.*, M. W. P. Hudson; Musgrove Scholarship, £35, F. J. Hackwood; William Tite Scholarship, £25, E. G. Housden.

REGISTRAR-GENERAL'S DECENNIAL SUPPLEMENT (1901-1910).

II.

UP to the close of last century the diseases returned as causes of death were classified at the Central Office according to the system adopted by Dr. William Ogle. But in 1901 this system was modified by his successor, Dr. John Tatham, in order to coördinate the national records with the revised Nomenclature of Diseases promulgated at that time by the Royal College of Physicians of London. Only a few of the headings in the tables are affected by this modification, the list of diseases having been rearranged with a view to the preservation of continuity. Under the present scheme of tabulation the number of deaths assignable to a particular heading is determined by the rule that out of several causes of death mentioned in a certificate only one disease is to be selected for registration. Greater precision of certification has recently led to increased transference of deaths from indefinite to definite headings. Transfer on these lines has been materially aided in recent years by the judicious practice of appealing from the Central Office to medical certifiers for additional information in cases of deaths imperfectly attested. As a result of this expedient it is stated that in the course of last decennium more than 5000 additions were made to the entries both of tuberculosis and of cancer, and more than 1000 each to those of puerperal sepsis and appendicitis.

The Registrar-General highly appreciates the coöperation thus rendered gratuitously by the medical profession, without which correction of this kind would obviously be unattainable.

Mortality at Different Stages of Life and in the Two Sexes.

From an instructive series of tables we learn how the chief fatal diseases stand in relation both to one another and to the age constitution of the victims. The proportions, having been calculated on the facts of ten years, may be regarded as resting on a fairly reliable basis.

According to the experience of 1901–10 not less than 10·8 per cent. of the total mortality is due to tuberculosis, a larger proportion than that attributed to any other single cause. From age 15–20 onwards the bulk of this mortality is due to the pulmonary form of the malady. Next to tuberculosis stands heart disease, accounting for nearly another 10 per cent. Following these in order of importance the remaining chief causes of death are pneumonia, bronchitis, cancer, disease of blood-vessels, and diarrhœa. At ages 10 to 20 and 35 to 55 heart disease ranks second in order as a cause of death, while in the intervening period, 20 to 35, it ranks third. Thus for the greater part of life these disorders of the circulation, when they do not actually occupy first place, come second only to tuberculosis as causes of death. The second place is occupied by pneumonia at ages 0 to 5 and 20 to 35, by diphtheria and croup at 5 to 10, by cancer at 55 to 65, by diseases of blood-vessels at 65 to 75, and by bronchitis at ages above 75. At ages 25 to 65 pneumonia and appendicitis are most fatal to males, and whooping-cough, heart disease, and cancer to females.

The familiar epidemic diseases are generally more destructive to life in the first five years than in the whole remainder of life. This is particularly noticeable in the case of whooping-cough, measles, scarlet fever, diphtheria, and diarrhœa. With reference to the behaviour of these epidemic diseases in later life, and to the fact that adult mortality thus caused is generally greater amongst females, Dr. T. H. C. Stevenson suggests that this may be due to their more frequent exposure to infection through sick nursing and other family duties. He finds that adult mortality from scarlet fever and from diphtheria is higher among women, whereas from small-pox, enteric fever, and cerebro-spinal fever it is considerably higher in men, among whom the risk of infection from domestic sources would often not be so serious. The incidence on the sexes of mortality from small-pox and enteric fever does not greatly differ throughout childhood, but on the attainment of adult age the mortality of males far exceeds that of females. This is also true of pneumonia.

Streptococcus diseases.—This group, including erysipelas, septicæmia, pyæmia, and phlegmon, with carbuncle and cellulitis, may be said to possess in some sense a common type of age distribution, about 25 per cent. occurring in the first five years, and the remainder being widely scattered over the rest of life. But whilst the *local* infections are seldom dangerous to older children and young adults, the *general* infections, pyæmia and septicæmia, are very fatal during youth and correspondingly less fatal in old age.

Syphilis.—General paralysis of the insane and locomotor ataxy being now regarded as particular manifestations of syphilitic infection, much attention has recently been devoted to these diseases. The total mortality from the first of these conditions is more than three times as heavy for males as for females. There appears to exist little difference between the sexes in regard to the loss of life thus caused among young persons, the higher proportion of juvenile to total mortality in the female sex being due to the lower aggregate mortality of females. We learn that at ages below 20 years, when the disease originates in congenital syphilis, which affects both sexes alike, males and females are equally liable; but that at ages above 25 years, when most of the cases are due to acquired syphilis, the remarkable excess of male mortality becomes evident. The same feature obtains in a less degree in the case of syphilis itself, and it may be that the suppression of facts which notoriously prevails in regard to that disease affects men more than women. That sex has a real influence on mortality arising from syphilitic taint appears from comparison with locomotor ataxy. Although both this disease and general paralysis have a common origin in syphilitic contamination, the excess of male mortality is considerably greater in the case of locomotor ataxy. Moreover, the tendency of approximation of female to male mortality in old age, which is apparent in the case of syphilis as well as of general paralysis, is believed to be absent in the case of locomotor ataxy.

Tuberculosis.—The most striking feature of these tables is the prominent position occupied by tuberculosis, which at ages from 5 to 55 accounts for more deaths than any other single cause. Between the ages of 20 and 25 it causes more than 40 per cent. of the aggregrate mortality in both sexes. The deaths assigned to tuberculosis in 1901–10 amounted to 565,161, and were fewer by 50,845 than in the previous decennium. Corrected for estimated increase of the population the difference becomes 121,941. The life saving claimed may be still further increased if allowance is made for the fact that the constitution of the population in the recent decennium was more favourable to tubercle mortality than had been that of 1891–1900.

The standardised death-rate in 1901–10 was equal to 1646 per million living, or 18·6 per cent. less than in the decennium immediately preceding. During the 50 years elapsed since 1861–70, tuberculous mortality has been nearly halved among males and more than halved among females. The greatest reduction among males occurred at ages 10–25, and among females at ages 15–45. At ages 45–65 the mortality of women has fallen more than twice as much as that of men.

From the degree in which tuberculosis has contributed to the total deaths at various ages during the last 60 years it appears that the disease is now of less relative importance as a cause of death than in earlier years. This change is much more conspicuous amongst females. It applies in each sex to all ages, except 5–10 and 10–15, when mortality from all causes is relatively low. The ages at which tubercle contributed most to the total death-rate ever since 1860 have been 20–35 for males and 15–25 for females. At the latter age it accounted for rather more than half the total deaths of females during 1851–70, but this proportion has recently fallen to a little over 40 per cent. At all adult ages the disease now plays a more important part in the mortality of males than of females, although during 1851–70 this was the case only at ages above 45. The concentration of tuberculous fatality upon the most valuable working period of life is a startling fact which should receive the earnest attention of the new Minister of Health, to whom it may be suggested in the words of the text, that "the period of early maturity which is specially attacked in both sexes is that at which the proportion of future productivity to dependence is at its maximum, and at which, therefore, deaths are the greatest loss to the community."

Changes of Mortality in Three Decennia.

Hitherto the study of disease incidence and mortality has been limited in these pages to the experience of a single

decennium. But Dr. Stevenson now furnishes us with the means of tracing the changes of this incidence in the course of the three successive decennia from 1881–90 onwards. The standardised death-rates in each of the last three decennial periods are compared with the aid of a table from which it appears that for all causes jointly a decrease of 16 per cent. in 1891–1910 has succeeded to a decrease of 3 per cent. only in the decennium immediately preceding.

The following are the principal declines in mortality recorded during the last 30 years—a period nearly corresponding to that which has elapsed since the passing of the great Public Health Act. From enteric fever the fall has been equal to 48 per cent., from influenza to 43 per cent., from diphtheria and croup to 36 per cent., from bronchitis to 36 per cent., from puerperal septic diseases to 34 per cent., from gout to 32 per cent., and from pleurisy to 31 per cent.

As against these large declines, as well as many others of a substantial nature, the only important increases recorded are those from cancer, diabetes mellitus, and Bright's disease. Of these by far the most important is the increase of cancer, the standardised rate for which is higher by 13 per cent. than in the previous decennium, this increase being only at half the rate shown in the preceding period.

It is significant that the two chief diseases for the recognition of which examination of the urine is important, diabetes and Bright's disease, are both included in the short list of recorded increases. Such aids to medical diagnosis are no doubt more generally practised by physicians as time goes on, and Dr. Stevenson regards it as quite conceivable that this fact may largely or wholly account for the increase shown in the tables. The slight increases recorded from valvular heart diseases and from angina pectoris may be dismissed as due merely to improvements in certification, seeing that diseases of the heart and blood-vessels in the aggregate show a considerable reduction. For a similar reason the slight increase from pneumonia may be also dismissed.

TUBERCULOSIS IN ITALY.[1]

THE American Red Cross Commission on Tuberculosis in Italy entered on its inquiry with three guiding principles of action: "First, that no wise plan of coöperation could be drafted in a foreign country without first gathering intimate knowledge of its people and of existing health conditions; second, that no matter how well trained men and women might be for work in America, this was not necessarily an indication of their preparation for work in a foreign country; third, that sympathetic relations between workers and people must be developed through the avenue of mutual knowledge." A long course of preliminary study was accordingly undertaken before the actual work was entered on; and, indeed, the entire investigation appears to have been conceived and carried out in the most thorough and exhaustive manner possible.

Mortality from Tuberculosis in Italy Compared with other Countries.

The mortality from pulmonary tuberculosis in Italy was 115 per 100,000 in the quinquennium 1909–1913, the same as in Scotland and the Netherlands; in Ireland and in Norway it was 173; in England and Wales it was 105; in Belgium (1908–1912), 99; in France (1907–1911), 183. Though there are 20,540 beds available for tuberculous soldiers and discharged prisoners, it is stated that more than half are unoccupied, and that in Sicily a hospital with 800 beds has only five patients. Hospital life and its restrictions are said to be disliked by the Italians. Although the tuberculosis question is therefore not so serious as in some other countries, the decline in mortality from this cause has not been satisfactory during the last 50 years, and during the war there has been a larger proportional increase in spite of favourable conditions of climate.

Scope of the Inquiry.

In view of existing organisations of the Italian Red Cross and the Government, the American Commission decided, after careful inquiry, to limit their work to the provinces of Liguria, Umbria, Palermo, and the island of Sardinia. The ideal organisation that was aimed at comprised these four sections:—Public health, Antituberculosis methods, Child welfare, and School hygiene; and committees were appointed to deal with (1) hospitals and sanatoriums, (2) dispensaries, (3) teaching of general hygiene, (4) finance, (5) medical instruction, (6) research into social conditions, with various subcommittees. Local authorities and influential persons were approached and assistance offered on the lines suggested. Says the report:—

"The Italian minds were open and alert to the necessity for it (the inquiry), keen to put it into operation; the American minds, constantly having in view what was best for Italy adapted as the Italian saw it, were willing to coöperate in order to enable the Italians to secure it. The combination made a successful issue in each of the provinces chosen."

Thus, in Sardinia Mr. and Mrs. Charles W. Wright established a provincial organisation; at Palermo an anti-tuberculosis league was formed, with correlation of the work of existing organisations and extending it throughout the whole of Sicily. In the organisation the keystone was the full-time paid executive secretary, as would always be the case in similar movements in this country or in America, though in Italy the plan was practically unknown and untried. The public health nurse or visitor, who would carry the instruction given by the physicians in the dispensaries directly into the homes of the applicants for relief, was also practically unknown in Italy.

Schools Opened for Italian Students.

Three schools were opened in Rome, Genoa, and Palermo, committees of Italian women being formed to act as boards of trustees, to assure the continuance of the work; only Italian students were accepted, and American nurses acted as teachers and consultants, their value being fully appreciated by the Italian physicians, and their services being completely and immediately acceptable in the homes of the people. A Section of School Hygiene was established to deal with the needs of the 3½ million children on the school registers, as well as those of an additional million not so accounted for. The birth-rate in 1914 was 31·1 per 1000; in 1916 it had dropped to 24·4; in 1918 it is considered that this ratio had fallen to somewhere between 19 and 16 for the whole country; the infantile death-rate (1910–1914) was 138 per 1000 living births; this had risen to 171 per 1000 in the large cities in 1917

Housing Difficulties: An Antimalarial Campaign Wanted.

The question of housing is considered in the report, among the special points being the size of the tenement dwellings generally occupied by the working classes in the large towns, and the difficulties presented by the numerous villages situated on hill-tops, of historic interest and picturesque charm, but hygienically presenting "so serious a problem that one wonders what the next step for Italy can be to secure an amelioration of their darkness, and dampness, and sanitary inefficiency." A long antimalarial campaign is first required. Malaria, which in 1914 had been reduced to 129,000 cases, increased during the war to 302,499 cases in 1917; and these were only the "reported cases," probably not nearly all that occurred. Pellagra has apparently not increased, but returns are not available for this disease.

Italian Claims for Coöperation: Practical Suggestions.

In conclusion, the report states that Italy, "the youngest of the nations," has the following claims for full coöperation with the other nations of the world: (1) a low death-rate and high birth-rate; (2) a people who love her, no matter where they go; (3) an accomplishment as United Italy which justifies her ancient tradition; (4) as one of the greatest contributors to the labour of construction throughout the world. America owes her an especial debt, not to be paid in material things, but by fraternal coöperation. Four practical suggestions are given for carrying this out: the preparation annually in foreign languages by national and State governments of "descriptive material and charts, showing their progress in the great social movements, to be sent with the general reports for fuller reference to foreign Ministers and libraries. This method has long been used by industrial concerns in Germany, which prepare their catalogues in the language of the country in which they propose to sell, with the price quotations in the money of that country, based upon delivery at the door of the consumer. At the same time information as to international standards of public health and welfare should be

[1] Report of the American Red Cross Commission.

interchanged by means of a sanitary commission. Secondly, small consultative commissions, working through diplomatic channels, should secure the adoption of similar public health and welfare standards, as already has been done in regard to military and industrial affairs. A third suggestion is the establishment of international scholarships for the teaching and practice of public health and welfare work; a beginning in this direction has already been made in the scholarships offered to France by Miss E. Chalfant and Mrs. W. S. Mitchell of Pittsburgh, and the Boston French Tuberculosis Committee, also by Mr. R. B. Mellon, of Pittsburgh, who has provided three scholarships for an exchange of public health nurses between America and Italy. The value of such coöperation is undoubted, and the present instance is practical proof.

Supplementary Reports.

To the general report above summarised, which is signed by Dr. William Charles White, the Director of the Commission, is appended a supplementary report of the Nursing Section by Mary S. Gardner, which describes the various forms of nursing that are actually in operation, and the chief points that need attention to make the service a satisfactory one according to modern requirements. To this succeeds a study of the health statistics by Mr. Knud Stouman. An excellent map of Italy shows by graduated shading the tuberculosis mortality in the various provinces of the Kingdom.

URBAN VITAL STATISTICS.

VITAL STATISTICS OF LONDON DURING JULY, 1919.

In the accompanying table will be found summarised statistics relating to sickness and mortality in the City of London and in each of the metropolitan boroughs. With regard to the notified cases of infectious disease it appears that the number of persons reported to be suffering from one or other of the ten diseases notified in the table was equal to an annual rate of 5·9 per 1000 of the population, estimated at 4,026,901 persons; in the three preceding months the rates had been 4·6, 4·5, and 4·7 per 1000. Among the metropolitan boroughs the lowest rates from these notified diseases were recorded in Hammersmith, Fulham, the City of Westminster, Hampstead, and the City of London; and the highest in Bethnal Green, Stepney, Southwark, Bermondsey, and Greenwich. Five cases of small-pox were notified during the month, against 7, 2, 3, and 2 in the four preceding months; of these cases 4 belonged to Woolwich and 1 to Bethnal Green. The cases of small-pox under treatment in the Metropolitan Asylums Hospitals at the end of the month numbered 2, against 6, 1, 3, and 2 at the end of the four preceding months. The prevalence of scarlet fever was 50 per cent. more than in the preceding month, and was considerably higher than in any other month of the present or preceding year; this disease was proportionally most prevalent in Stoke Newington, Stepney, Southwark, Bermondsey, Deptford, and Greenwich. The Metropolitan Asylums Hospitals contained 1516 scarlet fever patients at the end of the month, against 1043, 1066, and 1132 at the end of the three preceding months; the weekly admissions averaged 236, against 138, 150, and 157 in the three preceding months. Diphtheria was slightly more prevalent than in the preceding month; the greatest prevalence of this disease was recorded in Hackney, Shoreditch, Bethnal Green, Southwark, Bermondsey, and Lewisham. The number of diphtheria patients under treatment in the Metropolitan Asylums Hospitals, which had been 1134, 1086, and 1021 at the end of the three preceding months, rose to 1168 at the end of July; the weekly admissions averaged 153, against 151, 145, and 138, in the three preceding months. Enteric fever was somewhat more prevalent than in the preceding month; of the 40 cases notified during the month, 9 belonged to Woolwich, 5 to Wandsworth, 5 to Camberwell, 4 to Stepney, and 3 to Chelsea. There were 34 cases of enteric fever under treatment in the Metropolitan Asylums Hospitals at the end of the month, against 16, 19, and 25 at the end of the three preceding months; the weekly admissions averaged 5, against 2, 3, and 5 in the three preceding months. Erysipelas was proportionally most prevalent in St. Marylebone, Stoke Newington, Holborn, Bethnal Green, and Southwark. The 22 cases of puerperal fever notified during the month included 4 in Islington and 2 each in Paddington, Hackney, Poplar, and Southwark. Of the 14 cases of cerebro-spinal meningitis, 2 belonged to Fulham, 2 to Poplar, and 2 to Southwark; while of the 14 cases of poliomyelitis 2 belonged to Paddington and 2 to Camberwell.

The mortality statistics in the table relate to the deaths of civilians belonging to the several boroughs, the deaths occurring in institutions having been distributed among the boroughs in which the deceased had previously resided. During the five weeks ended August 2nd the deaths of 3801 London residents were registered, equal to an annual rate of 9·8 per 1000; in the three preceding months the rates had been 15·0, 11·1, and 9·7 per 1000. The death-rates ranged from 6·5 in Fulham, 7·8 in Lewisham, 7·9 in Stoke Newington, 8·4 in Battersea, 8·4 in Woolwich, 8·7 in Hampstead, and 8·7 in Shoreditch, to 11·1 in Southwark, 11·3 in Finsbury, 11·4 in Kensington, 11·5 in Deptford, and 12·4 in Holborn. The 3801 deaths from all causes included 154 which were referred to the principal infectious diseases; of these, 2 resulted from small-pox, 24 from measles, 14 from scarlet fever, 41 from diphtheria, 12 from whooping-cough, 6 from enteric fever, and 55 from diarrhœa and enteritis among children under 2 years of age. No death from any of these diseases was recorded in Fulham and the City of London. Among the metropolitan boroughs the lowest death-rates from these diseases were recorded in the City of Westminster, St. Marylebone, Hampstead, Shoreditch, Lambeth, Wandsworth, and Lewisham; and the highest in Chelsea, Stoke Newington, Stepney, Poplar, and Camberwell. The 2 fatal cases of small-pox belonged to Woolwich. The 24 deaths from measles were one-fifth of the average number in the corresponding period of the five preceding years; of these deaths 4 belonged to Bermondsey, 4 to

ANALYSIS OF SICKNESS AND MORTALITY STATISTICS IN LONDON DURING JULY, 1919.

(*Specially compiled for* THE LANCET.)

CITIES AND BOROUGHS.	Estimated civil population, 1917.	Notified Cases of Infectious Disease.											Deaths from Principal Infectious Diseases.								Deaths from all causes.	Death-rate per 1000 living.
		Small-pox.	Scarlet fever.	Diphtheria.*	Typhus fever.	Enteric fever.	Other continued fevers.	Puerperal fever.	Erysipelas.	Cerebro-spinal meningitis.	Poliomyelitis.	Total.	Annual rate per 1000 persons living.	Small-pox.	Measles.	Scarlet fever.	Diphtheria.*	Whooping-cough.	Enteric fever.	Diarrhœa and enteritis (under 2 years).	Total.	Annual rate per 1000 persons living.		
LONDON	4,026,901	5	1243	758	—	40	1	22	189	14	14	2286	5·9	2	24	14	41	12	6	55	154	0·4	3801	9·8
West Districts:																								
Paddington	122,507	—	31	22	—	1	—	2	5	—	2	63	5·4	—	—	1	1	1	—	1	4	0·3	108	9·2
Kensington	151,535	—	25	28	—	2	—	1	6	1	1	64	4·4	—	—	—	2	—	—	3	5	0·3	165	11·4
Hammersmith ...	114,952	—	22	13	—	2	—	1	5	—	1	44	4·0	—	1	—	—	2	1	3	7	0·6	105	9·5
Fulham	145,186	—	30	12	—	—	—	1	7	2	—	52	3·7	—	—	—	—	—	—	—	—	—	91	6·5
Chelsea	57,368	—	15	8	—	3	—	—	—	—	—	26	4·7	—	—	1	1	—	—	2	4	0·7	59	10·7
City of Westminster	122,046	—	7	14	—	1	—	—	5	—	—	27	2·3	—	—	—	1	—	1	—	2	0·2	118	10·1
North Districts:																								
St. Marylebone ...	92,796	—	20	10	—	—	—	1	8	—	1	40	4·5	—	1	—	—	—	—	[illegible]	2	0·2	93	10·5
Hampstead	75,649	—	11	5	—	1	—	—	2	—	—	19	2·6	—	—	1	—	—	—	—	1	0·1	63	8·7
St. Pancras	186,600	—	35	37	—	—	—	—	13	—	—	85	4·8	—	3	1	—	—	—	1	5	0·3	191	10·7
Islington	297,102	—	91	54	—	—	—	4	16	—	1	166	5·8	—	1	1	7	1	—	8	18	0·6	303	10·6
Stoke Newington...	47,426	—	20	7	—	—	—	—	4	1	—	32	7·0	—	—	1	1	1	—	—	3	0·7	36	7·9
Hackney	196,598	—	57	48	—	1	1	2	13	1	1	124	6·6	—	—	—	2	1	—	3	6	0·3	178	9·4
Central Districts:																								
Holborn	35,303	—	5	·8	—	—	—	—	3	—	—	16	4·7	—	—	—	2	—	—	—	2	0·6	42	12·4
Finsbury	68,011	—	24	10	—	—	—	1	2	1	1	39	6·0	—	—	—	1	—	—	1	2	0·3	74	11·3
City of London ...	16,138	—	2	1	—	—	—	—	—	—	—	3	1·9	—	—	—	—	—	—	—	—	—	15	9·7
East Districts:																								
Shoreditch	89,675	—	14	26	—	—	—	—	5	—	—	45	5·2	—	—	—	1	—	—	1	2	0·2	75	8·7
Bethnal Green ...	107,362	1	40	41	—	—	—	1	15	—	1	99	9·6	—	—	—	2	—	—	2	4	0·4	101	9·8
Stepney	232,010	—	151	54	—	4	—	—	8	1	—	218	9·8	—	1	3	3	2	—	13	22	1·0	217	9·8
Poplar	143,443	—	36	21	—	2	—	2	9	2	—	72	5·2	—	1	1	5	2	—	1	10	0·7	141	10·3
South Districts:																								
Southwark	167,936	—	86	45	—	1	—	2	14	2	—	150	9·3	—	—	—	1	1	1	2	5	0·3	178	11·1
Bermondsey	107,635	—	76	41	—	—	—	—	6	—	—	123	11·9	—	4	1	—	—	—	—	5	0·5	102	9·9
Lambeth	272,038	—	78	41	—	—	—	1	14	—	1	135	5·2	—	3	—	2	—	—	—	5	0·2	282	10·8
Battersea	150,023	—	44	14	—	—	—	1	4	—	1	64	4·4	—	—	1	—	—	1	2	4	0·3	121	8·4
Wandsworth	300,787	—	96	37	—	5	—	—	4	1	—	143	5·0	—	2	—	2	—	1	1	6	0·2	275	9·5
Camberwell	239,461	—	55	46	—	5	—	—	8	—	2	116	5·1	—	4	—	4	1	—	6	15	0·7	241	10·5
Deptford	103,527	—	42	21	—	2	—	—	3	—	1	69	7·0	—	1	1	1	—	—	2	5	0·5	114	11·5
Greenwich	90,440	—	56	20	—	1	—	—	5	1	—	82	9·5	—	1	—	1	—	—	1	3	0·3	86	9·9
Lewisham	161,406	—	55	45	—	—	—	1	2	1	—	104	6·7	—	1	1	—	—	—	—	2	0·1	121	7·8
Woolwich...	131,942	4	20	29	—	9	—	1	3	—	—	66	5·2	2	—	—	1	—	1	1	5	0·4	106	8·4
Port of London ..	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

* Including membranous croup

Camberwell, 3 to St. Pancras, 3 to Lambeth, and 2 to Wandsworth. The 14 fatal cases of scarlet fever were 3 less than the average; 3 of these belonged to Stepney. The 41 deaths from diphtheria were 10 below the average; of these deaths 7 belonged to Islington, 5 to Poplar, 4 to Camberwell, and 3 to Stepney. The 12 fatal cases of whooping-cough were one-sixth of the average number; of these, 2 belonged respectively to Hammersmith, Stepney, and Poplar. The 6 deaths from enteric fever were 4 less than the average. The 55 deaths from diarrhœa and enteritis among children under 2 years of age were 64 below the average number; the greatest proportional mortality from this disease was recorded in Hammersmith, Chelsea, Islington, Stepney, and Camberwell. In conclusion, it may be stated that the aggregate mortality from these principal infectious diseases in London during July was 60 per cent. below the average.

(Week ended August 16th, 1919.)

English and Welsh Towns.—In the 96 English and Welsh towns, with an aggregate civil population estimated at 16,500,000 persons, the annual rate of mortality, which had been 10·3, 9·7, and 9·7 in the three preceding weeks, rose to 10·0 per 1000. In London, with a population slightly exceeding 4,000,000 persons, the annual rate was 10·4, or 0·9 per 1000 above that recorded in the previous week, while among the remaining towns the rates ranged from 3·2 in Hornsey, 3·7 in Wallasey, and 4·1 in Walsall, to 15·5 in Southport, 16·1 in Hastings, and 17·5 in Gateshead. The principal epidemic diseases caused 174 deaths, which corresponded to an annual rate of 0·5 per 1000, and included 92 from infantile diarrhœa, 35 from diphtheria, 28 from measles, 10 from whooping-cough, 5 from scarlet fever, and 4 from enteric fever. Measles caused a death-rate of 1·3 in Gateshead, 1·5 in Salford, and 1·7 in Edmonton. There were 1517 cases of scarlet fever and 1112 of diphtheria under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital, against 1547 and 1092 respectively at the end of the previous week. The causes of 21 deaths in the 96 towns were uncertified, of which 6 were registered in Birmingham and 2 each in Gloucester and Gateshead.

Scotch Towns.—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2,500,000 persons, the annual rate of mortality, which had been 11·1, 10·6, and 10·0 in the three preceding weeks, further fell to 9·9 per 1000. The 232 deaths in Glasgow corresponded to an annual rate of 10·8 per 1000, and included 14 from infantile diarrhœa, 6 from diphtheria, 4 whooping-cough, and 1 each from enteric fever and measles. The 70 deaths in Edinburgh were also equal to a rate of 10·8 per 1000, but did not include any from the principal epidemic diseases.

Irish Towns.—The 111 deaths in Dublin corresponded to an annual rate of 14·3, or 1·6 per 1000 above that recorded in the previous week, and included 28 from infantile diarrhœa and 1 from measles. The 82 deaths in Belfast were equal to a rate of 10·7 per 1000, and included 6 from infantile diarrhœa and 1 from scarlet fever.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg.-Cdr. J. Chambers to be Surgeon-Captain.
Surg.-Cdr. T. H. Vickers is placed on the Retired List at own request.
Surg.-Capt. E. C. Lomas is placed on the Retired List.

ARMY MEDICAL SERVICE.

Col. C. H. Melville, C.M.G., retires on retired pay.

ROYAL ARMY MEDICAL CORPS.

Majors relinquish the acting rank of Lieutenant-Colonel on re-posting: A. C. H. Gray, C. R. Millar.

Major S. M. W. Meadows, D.S.O., and Major and Bt. Lieut.-Col. A. McMunn relinquish the temporary rank of Lieutenant-Colonel on re-posting.

The undermentioned relinquish the acting rank of Major: Capt. and Bt. Major R. E. Barnsley; Capts. L. J. Shell, C. H. Brennan, R. A. Austin; Temp. Capts. W. Haward, J. V. Grant, M. R. Mackay, W. T. Hessel, Joseph S. Stewart, A. C. B. McMurtrie, R. J. Vernon, H. M. Vickers, I. Jones, L. M. Smith, G. Jackson, G. E. Neligan, J. F. McG. Sloan, T. E. Amyot, J. McDonnell, M. A. Power, L. G. McCune, C. G. McAdam, F. W. Wesley, T. Muir Crawford.

To be acting Majors: Capts. F. W. Matheson, W. B. Adam; Temp. Capts. S. Stockman, R. S. S. Statham, R.E. H. Leach, P. P. J. Stewart, C. E. Walker.

Capt. G. D. Robertson resigns his commission.

Capt. N. T. Whitehead relinquishes the acting rank of Lieutenant-Colonel on ceasing to command a Medical Unit.

Capt. D. H. C. MacArthur relinquishes the acting rank of Major.

Capt. R. H. Graham, from Spec. Res., to be Captain.

Temporary Captains to be Captains: R. N. Porritt, A. R. Oram.

Captains from the T.F. to be Captains: G. F. Carr, C. M. Gozney.

Temporary Lieutenants to be temporary Captains: J. Paxton, V. D. Pennefather, G. S. Livingston, N. B. Benjafield, J. McClellan, A. P. Mitchell, G. H. Dart, J. C. Warwick, E. H. Milson, A. E. Hodgkins.

Capt. A. G. Harsant, from Spec. Res., to be Lieutenant, and to be temporary Captain.

Temp. Lieut. J. E. Rea to be Lieutenant.

Officers relinquishing their commissions:—Temp. Lieut.-Cols. (retaining the rank of Lieutenant-Colonel) E. W. Goodall, W. D. Buncombe, F. S. Toogood, A. D. Reid, H. L. Eason; Temp. Hon. Major G. Hodge (retains the honorary rank of Major); Temp. Major and Brevet Lieut.-Col. A. W. Robinson (retains the rank of Brevet Lieutenant-Colonel); Temp. Majors (retaining the rank of Major) G. H. Ross, T. Mackenzie; Temp. Capts. and Brevet Majors (retaining the rank of Brevet Major) W. S. Stalker, E. C. Williams, R. McC. Hill; Temporary Captains granted the rank of Major: D. D. Craig, W. B. Davy, J. R. M. Whigham, A. W. Uloth, A. K. H. Pollock, A. E. Marsack, J. W. Littlejohn, F. W. Wesley; Temporary Captains retaining the rank of Captain: J. Scott, R. W. Valentine, H. L. Morrow, R. T. Stoney, T. F. S. Fulton, J. H. Wilks, T. Brodie, C. Brash, D. McCormack, J. S. Annandale, B. L. Livingstone-Learmouth, J. M. Wnyte, J. E. M. Wigley, P. A. Creux, S. H. L. Archer, S. E. Murray, R. H. S. Marshall, P. J. Kelly, J. C. D. Allan, L. H. Leeson, B. F. Macnaughton, F. R. Hassard, D. Whyte, S. Y. Walsh, W. A. Proud, G. R. Bickerstaff, A. W. Adams, E. G. Fenton, J. M. Wishart, W. B. A. Moore, H. W. Crowe, J. M. Gibson, D. MacGregor, J. C. Hindley, J. Patrick, L. Zealand, F. F. Carr-Harris, C. G. G. Winter, J. S. Stewart, D. H. Paul, R. F. Wilkinson, A. G. Gilchrist, C. W. Smith, G. Matthews, D. F. A. Neilson, R. W. Smith, A. B. Raffle, J. H. Wrightson, E. Duke, A. M. Clare, R. A. Flynn, E. Billing, A. Brown, C. W. Fowler, F. H. Diggle, P. N. Vellacott, B. G. Gutteridge, J. R. Marrack, H. W. Parnis, J. F. Carroll, C. H. Aylen, G. O. Grain, C. E. Bashall, A. G. Naismith, O. H. Bowen, S. T. Parsons-Smith, G. M. C. Powell, L. P. Booth; Temp. Hon. Capt. J. B. Fearn (retains the honorary rank of Captain); Temporary Lieutenants retaining the rank of Captain: W. A. Mein, L. H. McConnell, D. R. Wheeler, W. Gilmore.

Canadian Army Medical Corps.

Temp. Major (acting Lieut.-Col.) E. L. Pope to be temporary Lieutenant Colonel.

Temporary Captains (acting Majors) relinquishing the acting rank of Major: N. W. Strong, W. E. Gaillie.

The undermentioned temporary Captains retire in the British Isles:—W. B. Honey, C. V. Bailey, T. V. Hunter, H. J. Theriault, J. A. MacKenzie, J. A. Jardine, J. R. Le Touzel, W. A. Marshall, P. A. Leacy, W. H. Hills, C. V. Mills, M. R. Boe, H. H. Perry.

Canadian Army Dental Corps.

Temp. Capt. B. E. Brownlee retires in the British Isles.

SPECIAL RESERVE OF OFFICERS.

Capt. J. P. Charnock relinquishes the acting rank of Major.

Capt. O. Williams to be acting Major.

Capt. A. C. Irvine relinquishes his commission.

Lieutenants to be Captains: M. Jackson, G. P. W. Staunton, T. H. Almond, J. N. Gale, J. W. Mann, F. K. Bacritt, A. C. Paterson, A. B. B. Paul.

TERRITORIAL FORCE.

Lieut.-Col. (acting Col.) F. W. Higgs relinquishes the acting rank of Colonel on vacating the appointment of Assistant Director of Medical Services.

Lieut.-Col. G. C. Taylor vacates the appointment of Deputy Assistant Director of Medical Services.

Lieut.-Col. R. Emmett relinquishes his commission on account of ill-health, and retains the rank of Lieutenant-Colonel.

Capts. (acting Majors) relinquishing the acting rank of Major on ceasing to be specially employed: C. S. Wink, C. M. Nicol, J. Anderson, W. E. Lee, J. Ramsay, J. Turtle, A. Wilson, D. G. Kennard, H. S. Wallace, A. J. A. McC. Dallas, P. J. Smyth.

Capt. (acting Major) M. B. G. Sinnnette relinquishes the acting rank of Major on vacating the appointment of Deputy Assistant Director of Medical Services.

To be acting Majors while specially employed: Capts. C. B. Whitehead, A. M. Jones, C. M. Nicol.

Capt. W. J. Hoyten relinquishes his commission on account of ill-health, and is granted the rank of Major.

Capt. S. A. McPhee relinquishes his commission on account of ill-health contracted on active service, and retains the rank of Captain.

4th London General Hospital: Lieut.-Col. A. H. Tubby is restored to the establishment.

1st Scottish General Hospital: Major H. Mc I. W. Gray is restored to the establishment on ceasing to hold a temporary commission in the Army Medical Service.

2nd Scottish General Hospital: Capt. J. W. Simpson is restored to the establishment.

2nd Western General Hospital: Capt. (acting Major) G. M. Benton relinquishes the acting rank of Major on ceasing to be specially employed.

2nd London Sanitary Company: Capt. B. R. Hebblethwaite is seconded for service under the Egyptian Government.

ROYAL AIR FORCE.

Medical Branch.—Major (acting Lieut.-Col.) B. R. Bickford, D.S.O. (Staff Surgeon, R.N.), relinquishes his commission on ceasing to be employed.

The undermentioned are transferred to unemployed list: Major C. F. Bainbridge, Capts. K. B. Aickman, R. Hall, Lieut. N. Homewood.

Capt. T. E. Mulvany relinquishes his commission on account of ill-health contracted on active service, and is permitted to retain his rank.

Lieutenants to be Captains: C. T. Costello, G. M. Mellor, H. C. Cox, G. Meadows, L. C. Broughton-Head, H. B. Troup, H. T. Prys-Jones, J. Coulter-Smith, R. Mugliston, P. E. Williams, C. Lumbrinadi, A. Kirkhope, P. M. Carroll, J. P. Horsford, A. K. Soutar, G. Dunderdale, J. P. Hennessy, G. W. Harbottle, M. J. Whelton, J. Valerie, J. P. Wells, A. St. J. Hennessey, G. W. J. Bousfield.

Dental Branch.—Lieutenants to be Captains: G. Warner, R. Fyson, C. M. Shirreff, H. L. Thorn, N. H. Medhurst, N. L. Smallbone, C. M. John, G. Hughes, G. F. H. Bloom.

INDIAN MEDICAL SERVICE.

Captains to be Majors: V. B. Green-Armytage, A. N. Dickson, A. G. Coullie, A. J. H. Russell, Dewan Hakumat Rai, W. H. Riddell.

Lieutenants to be Captains: J. P. Huban, Erach Ruttanji Daboo, M. M. Cruickshank, Anant Yashwant Dabholkar, Kekhasru Sorabji Master, S. A. McSwiney.

Temporary Lieutenants to be temporary Captains: Har Sukh Rai, Nawab-ud-Din, M. J. Saldanha, Yeshwant Vaman Modak, Ragavan Cheruvari Toyle, Abdul Kadir Muhammad Mahiuddin, A. Noble, Joy Devananda Sinha, Dinesh Chandra Chakrabarti, Ravu Venkata Rau, Annaswamy Muthukrishnan, Sadashiva Chintamon Lele, Jagdish Chandra Gupta, Coimbatore Srinivasa Rao Venkata Krishna Rao.

The following officers are permitted to retain the temporary rank of Captain on permanent appointment as Lieutenants: Durgadas Sanyal, Fazal-ud-Din, Girish Chandra Maitra, Bijitendra Basu, Sankaranal-narkoil Chidambaranatha Alagappan.

The King has approved the appointment of the undermentioned Lieutenants permanently to the Indian Medical Service: John Patrick Huban. Erach Ruttanji Dahoo. Martin Melvin Cruickshank, R.A.M.C. (T.C.), Anant Yashwant Dabholkar, I.M.S. (T.C.), Kekhasru Sorabji Master, I.M.S. (T.C.). Stephen Alphonsus McSwiney, R.A.M.C. (T.C.), Durgadas Sanyal, I.M.S (T.C.), Fazal-ud-Din, I.M.S. (T.C.), Girish Chondra Maitra, I.M.S. (T.C.). Bijitendra Basu. I.M.S. (T.C.), Sankaranainarkoil Chidambaranatha Alagappan, I.M.S. (T.C.).

Indian Defence Force.—Lieutenant to be Captain: J. S. Nicolson.

The King has approved the relinquishment of temporary rank in the Indian Medical Service and Indian Defence Force by Captain A. MacI. Ramsay.

HEALTH OF TROOPS ON AFGHAN FRONTIER.

The Secretary of State for India, in a written answer to a question by Colonel Yate concerning the arrangements made for the health and comfort of the troops on the North-West Frontier of India, denies the reports of deficiencies in the Afghan campaign. Quoting from a telegraphic report, he says that with regard to food, &c., two essentials at this time of the year are ice and mineral waters. Ice-machines are working at the following places: Rawal Pindi, Nowshera, Peshawar, Kohat, Bannu, Dardoni, Tank, Dera Ismail Khan, and Quetta, and further machines are under erection. As regards soda-water machines, 22 are already working on the frontier and six more are on their way to the frontier. The total daily output of these machines will be approximately 90,000 bottles. This output is in addition to that of local factories. Each machine is being sent up complete with cylinders and bottles for one month's consumption, and a reserve of three months has been arranged for. Mineral waters are issued to all officers and men in hospital. The scale of rations for British and Indian troops is much superior to any previously granted for campaigns in India. Under the new scale for Indian troops the meat ration has been doubled and a daily issue of fresh vegetables, condensed milk, as well as weekly issues of cigarettes, provided. Orders have been issued to all generals in command that medical officers are to ask for whatever they deem necessary for the comfort of the sick and wounded in their charge and that their demands are to be met at once. Additional hospitals for 4000 British and 8000 Indian troops have been established in specially fitted barracks in proximity to the frontier, and electric lighting and fans, where none already exist, are being supplied to the former. Convalescent depôts for officers and soldiers have, in addition, been formed, mainly in the Murree hills. Special arrangements have been made for the supply of fresh milk to the sick. Arrangements for providing additional equipment are in progress, and have been made already for the establishment of field force canteens for British and Indian troops. Special messes have been formed at various places for the use of individual officers passing through. Rest camps for British and Indian troops en route to the front have also been organised. To ensure that the arrangements for the health and comfort of the troops are working satisfactorily and up to the standard designed by the Commander-in-Chief in India, staff officers from general headquarters carry out under his Excellency's orders frequent tours of inspection on the frontier. Specific inquiry is being made into each definite allegation of deficiency that is brought to notice.

Medical News.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH.—An extraordinary meeting of the College was held on August 8th, Sir Robert Philip, the President, in the chair. H.R.H. the Prince of Wales having signified his willingness to accept the Honorary Fellowship of the College, was elected by acclamation.

ROYAL COLLEGE OF PHYSICIANS OF IRELAND AND ROYAL COLLEGE OF SURGEONS IN IRELAND.—At the Conjoint Examinations held recently the following candidates were successful:—

THIRD PROFESSIONAL EXAMINATION.

H. C. Bell, Miss L. H. Byrne, J. F. J. Cleary, R. H. Dolan, M. A. English, J. Fitzsimons, J. J. Fitzsimons (honours), Mrs. M. W. Frazer, T. P. Hefferman, T. E. Kavanagh, Miss A. Ledlie, J. I. Levi, J. J. McHenry, Miss M. G. Neill, Miss I. P. Nelis, Miss M. C. O'Brien, R. C. Ogden, J. O'Leary, J. J. O'Sullivan, P. J. Quigley, T. J. Ryan, W. H. Sexton, R. B. Shaw, J. Tehan (honours), J. W. Tighe, A. D. Watchman, and T. G. Whitcroft.

FINAL PROFESSIONAL EXAMINATION.

Michael Barden, Baron Asher Cowan, Joseph Cockburn, Thomas Coffey, Robert Stafford Conyngham John Francis Gallagher, Daniel Hegarty, Alexander Francis Mallon, John Patrick Morgan, Bernadine Thomas McMahon, James McAleer, Michael Joseph O'Connor, Frank Gaeda Phillips, Joseph Power, Joshua Pousner, Andrew Thomas Rhatigan, Thomas Kerry Reddin, and William Edward Shipsey.

DIPLOMA OF PUBLIC HEALTH.

Patrick Ashe, Geoffrey Collins, Ignatius B. Culhane, Edmund W. Lynch, John D. MacCormack, S. D. G. McEntire, C. C. Macredy, Lionel M. Rowlette, and J. R. Bibby.

ROYAL COLLEGE OF SURGEONS IN IRELAND.—At examinations held recently the following candidates were successful:—

PRIMARY FELLOWSHIP EXAMINATION.

Robert H. L. M. Corbet, W. J. Corkey, Mary G. Hogan (honours), and Eric S. Horgan.

FINAL FELLOWSHIP EXAMINATION.

W. H. W. C. Carden, J. V. Cope, and J. A. Fretton.

As we announced last week, the League of Red Cross Societies have appointed an International Commission to investigate the public health conditions in Poland, with a special view to providing against the spread of typhus and other epidemics across Western Europe. Dr. Addison, the Minister of Health, has lent to the International Commission the services of Dr. G. S. Buchanan, the other members of the Commission being: for Italy, Professor Castellani; for the United States, Colonel H. Cumming; and for France, Lieutenant-Colonel Visbecq, of the Service de Santé of the French Army, the last in place of Monsieur E. Dopter, who has been prevented from starting for Poland.

EASTBOURNE AND CHILD WELFARE.—The members of the corporation of Eastbourne are far-seeing, and without opposition have voted no less a sum than £4500 for maternity and child welfare purposes. A home where the work has been carried on some time voluntarily has closed through lack of funds, and the corporation has stepped into the void. The scheme is being pushed on as the need is urgent owing to the house famine. Eastbourne is thus doing its part in the great work of conserving child life, the necessity for which has never been brought home so much as it is to-day.

MEDICAL SICKNESS, ANNUITY, AND LIFE ASSURANCE FRIENDLY SOCIETY.—A committee meeting of this society was held at 300, High Holborn on August 15th, when the accounts presented showed that influenza had practically disappeared in the claims for insurance. The volume of new business continues to be exceptionally good, but an increasing number of medical men appear to be retiring from practice at a comparatively early age, necessitating increased new business in maintaining the total membership. The claims are under the expectation for the month, but signs are not wanting that the strain on older members of the society during the last years is beginning to show, long rest from all work being then compulsory. This is essentially the kind of claim that proves the value of the society's sickness contract, for in many policies the benefit only lasts a certain time, while the society goes on paying for years if required.

All particulars may be had from the Secretary, Medical Sickness and Accident Society, 300, High Holborn, W.C. 1.

ROYAL MEDICAL BENEVOLENT FUND.—At the last meeting of the committee, held on August 12th, 30 cases were considered and £308 10*s.* voted to 27 of the applicants. The following is a summary of some of the cases relieved:—

Daughter, aged 47, of M.D. Lond. who practised in London and died in 1873. Lives with two elder sisters, one of whom receives help from the Fund. Has £15 per annum from dividends. Used to take in pupils, but now wishes to commence a school, and she asks for help towards books, stationery, &c. Voted £12 10*s.*—M.R.C.S. Eng., aged 44, who practised at Theale. Was in a serious motor accident in June, 1918, and is still suffering from head injury and loss of memory and is quite unable to work, and has had to sell his practice. Receives £24 pension from workhouse and £6 6*s.* a month from the Medical Sickness Society. Rent and rates £37 13*s.* 6*d.* Has three children; the eldest girl is at home and the other two children are at school. Voted £50.—Widow, aged 47, of F.R.C.S. Edin. who practised in London and died in February, 1919. Was left totally unprovided for, and is now acting as a temporary clerk at 37*s.* 6*d.* a week. Lives in one room and pays 8*s.* a week rent. Applicant's husband was helped by the Fund. Voted £5.—Widow, aged 53, of M.B., C.M. Aberd. who practised in London and died in 1917. Was left without means. Has three children; the two eldest are in the Army and both have been wounded, and the youngest is still in the hospital waiting to undergo an operation. She receives £62 a year from children and £26 from the Pensions Committee. Pays £26 a year rent. Voted £12 in 12 instalments.—Widow, aged 60, of L.R.C.P. Edin. who practised at Blackburn and died in 1902. Is at present doing domestic work at 9*s.* a week, but she suffers from ill-health and cannot stay long at any post. Was in the infirmary for a greater part of last summer. Has one daughter who acts as a children's nurse and receives £26 a year. Relieved six times, £30. Voted £12 in 12 instalments.—Daughter, aged 61, of L.F.P.S. Glasg. who practised at Lauchline, Ayrshire, and died in 1883. Is unable to work owing to ill health. Only income £15 from the Scottish Indigent Women's Fund. Pays £10 a year rent. Relieved 11 times, £116. Voted £18 in 12 instalments.—Daughter, aged 38, of M.D. Dub. who practised at Moorcroft, British Guiana, and died in 1884. Lives with her mother, who receives a pension of £50 per annum. Suffers from ill-health and is unable to earn her own living. Relieved 13 times, £120. Voted £10 in two instalments.—Widow, aged 63, of L.R.C.P. & S. Glasg. who practised at Walsall and died in 1902. Was left unprovided for with two children, who are now working and pay their mother £1 a week each, and applicant receives about £12 a year by needlework. Relieved 13 times, £142. Voted £5.—Daughter, aged 68, of M.R.C.S. Eng. who practised at Liverpool and died in 1851. Receives £6 a year from dividends and £52 a year from friends. Lost all her money through the failure of an Australian bank. Suffers from ill-health. Relieved six times, £72. Voted £12 in 12 instalments.—Widow, aged 51, of L.S.A. Lond. who practised at Plaistow and died in 1911. Was left with two children, now aged 16 and 14. The elder one wishes to train for a nurse; the younger is still at school. Applicant receives £100 a year from the sale of the practice and from late husband's life insurance, and has to pay £27 a year rent. Asks for help owing to increased cost of living. Relieved twice, £17. Voted £5.

Subscriptions may be sent to the acting honorary treasurer, Dr. Samuel West, at 11, Chandos-street, Cavendish-square, London, W. 1.

Correspondence.

"Audi alteram partem."

THE NEED FOR ACCESSORY FOOD FACTORS IN INFANT FEEDING.

To the Editor of THE LANCET.

SIR,—The appalling loss of life which occurred during the war brought into prominence for the first time the need for economy in life generally, and more especially that of infants. The survival of the less fit may be eugenically wrong, but so often infant life depends not on fitness to survive so much as in the knowledge and fitness of the mother. And so there came into being the vast organisation of infant welfare centres throughout the country and the initiation of schemes for ensuring adequate nourishment and care to growing infants. In London the raids put many nursing mothers off their milk, especially in the areas severely visited, and this at a time when the scarcity of cow's milk was keenly felt, and when whole districts were without adequate supply. Then it was that the Government wisely encouraged the use of dried milk, and an exhaustive report on dried milk was made to the Local Government Board. It was shown that the absence or destruction of antiscorbutic factor in the dried milk had no apparent influence on the children's growth, nor did Barlow's disease appear save in very exceptional cases. There is no doubt that animals suffer from the deprivation of the antiscorbutic vitamine in their food much more rapidly and severely than does the human infant. The reason for this is not known. Whether the mother is able to transmit a tolerance in her infant to a vitamineless diet, or whether the human young require much less than do animals to keep them in health is pure speculation, but the probability is that when infantile scurvy has advanced to the stage of physical signs we have arrived at the last chapter of the disease, not the first. Zilva has shown that the growing teeth of the guinea-pig are very early affected by the absence of vitamine in the diet, and there is reason to suppose that the cause of some of the ailing, without actual disease, of infants is caused by the absence of vitamine. So far we have no knowledge of the influence of such absence on the early growth of the permanent teeth. At University College Hospital it has long been felt that it was not right wilfully to withdraw this vitamine from the diet of these artificially fed infants, even although no very obvious symptoms of scurvy had been encountered, and Dr. Harriette Chick suggested two years ago the use of an apple jelly the vitamine in which was not destroyed in the process of manufacture. This jelly was made for the Army, and, alas, is now unobtainable. It did not disagree, and was quite palatable. As the manufacture was discontinued, orange-juice has been used, and successfully, and is well tolerated by even the youngest infants. The rind is mixed with the pulp, as the essential oil, present only in the rind, preserves the juice for quite a long period. The minced orange is then squeezed through a tincture press and the juice collected. The doses given are a teaspoonful in a little sugared water twice daily under three months, and double that amount over that age.

As to the fat-soluble A factor, this is present in the dried milk in sufficient quantity to prevent rickets, but where in some cases the infant does not tolerate dried milk and diluted cow's milk has to be substituted the dilution of the cow's milk becomes an anxiety unless cream is added to the feed. Cream is unobtainable or prohibitive, and as the Marylebone cream is useless so far as fat-soluble is concerned a cream has been in use for many months at the Infant Department at University College Hospital made of beef suet, which is rich in fat-soluble. This cream has a richness in fat equal to ordinary skimmed cream, cannot go bad, and is dispensed at a very low cost. The conversion of suet into an emulsion miscible with all dilutions of milk was found to be difficult by reason of the high melting point of suet. This was overcome at last, and the method of manufacture and the formula (I quote from a paper by Mr. Hampshire and Mr. Hawker in Transactions of the British Pharmaceutical Conference, 1919) are as follows:—

Beef suet, 40 oz.; olive oil, 5 oz.; syrup, 25 fl. oz.; benzoic acid, 35 gr.; decoction of Irish moss, 70 fl. oz.; water to 1 gallon. "The oil is added to the melted suet and the benzoic acid dissolved in the mixture. The decoction is heated to about 60° C. and placed in the emulsifier, and the fats are then added at about the same temperature. The emulsion is then worked up and the syrup and water added last." I am, Sir, yours faithfully,

E. A. BARTON,
Medical Officer to Infant Department,
August 14th, 1919. University College Hospital.

THE INCIDENCE OF TUBERCULOSIS AMONGST ASYLUM PATIENTS.

To the Editor of THE LANCET.

SIR,—The paper by Dr. F. A. Elkins and Dr. Hyslop Thomson in your issue of August 9th brings forward many interesting points, to me none more so than the paragraph on clinical features, in which they insist on the extraordinary absence of the classical symptoms and signs of pulmonary tubercle which obtains in the asylum phthisical patient. This is, of course, a fact that is perfectly well known to those of us who have spent some time resident in institutions for the care of the insane, but it is, I find, not appreciated by those who have not, and it is important that it should be more widely known because, for one thing, large numbers of the more chronic insane are still under treatment in the union wards, where the resident or other medical officers are often of a temporary character, or, even if this is not the case, are not so *au fait* with these matters as the expert alienist.

My experience as medical officer in charge of the Western Command Epileptic Centre at the Nell Lane Military Hospital, where for the last two years of the war we have had 68 beds occupied by epileptic soldiers under careful observation, does not lead me to include epileptics under the heading of those predisposed to tubercle; these were, with few exceptions, sane epileptics, but we were struck with the small incidence of tubercle amongst them, smaller indeed, by a good deal, than the average incidence of tubercle amongst medical military patients as a whole.

I do not altogether agree with Dr. Elkins and Dr. Thomson in ascribing so much importance to contact infection when seeking for explanations of the war-time increase in asylum tubercle. To my mind, most of these patients had a latent focus of tubercle on admission, and owing to the poor food, the war-time rationed deficiency of fats, sugar, &c., the resistance was diminished so that the dormant focus became active again. Those who have made post-mortems at all frequently on the asylum type of patient know well that scars of healed apical tubercle are met with in the vast majority of these bodies, and it is casting no stigma on the asylum medical officer to suggest that on admission a far greater number were suffering from tubercle than are so recorded in the table given. His duties on the admission of a patient are to examine that patient and to fill up forms concerning him; he is especially interested in the mental condition, and it is not to be expected that he is likely to spot doubtful or latent foci in the lungs in the way that a tuberculosis specialist would.

"It is true that insane tuberculous patients have rarely any expectoration, and therefore the medium of infection is obviously not sputum." This seems to be going rather too far, both as regards reinfection in the bowel of the patient himself and infection of others in the same ward. In the insane phthisical patient the cough is absent, and sputum, in the strict sense of the word, is also absent, but the morbid material and secretion from the air passages *is* produced, and reaches the oro-pharyngeal cavity in some, though it may be in small, quantity, and is doubtless swallowed, constituting a medium of contact infection. In addition to this, the contents of the mouth and pharynx may be, as is well known, disseminated through the air for many feet—in the absence of coughing—by speaking, sneezing, or even by the snoring and stertorous breathing of so many of these cases, and such morbid material, being present in the mouth, may contaminate spoons, forks, and drinking vessels, hence infecting others if the washing arrangements are at all perfunctory. The same absence of cough and sputum, the same laryngeal anæsthesia, occur also in the deglutition pneumonia and pulmonary gangrene of asylum patients, another common cause of an insane patient's rapid decline, which has in these subjects the same insidious onset as pulmonary tubercle has.

The authors of the paper ascribe the transference of disease to infected hands and bedclothes. I believe this

holds good, to some extent, as far as the patient himself is concerned, but I do not think, in a well-ordered asylum, that the infection extends to those in neighbouring beds, where I think the natural predisposition of the mental case to tubercle or the lighting up of an old focus plus the diminished resistance from war-time poverty of rations will explain everything not explained by aerial transmission of mouth contents and possibly by contaminated eating and drinking utensils.

I agree entirely as to the importance of cubic space and ventilation. In asylum hospital wards it is often the case that too little air space is allowed for the case of acute infection. It is often also a fact that asylum ward ventilation is poor, given sufficient air space, owing to the bottoms of the windows being for other reasons at a higher level than usual from the floor. Tubercle in the insane is hopeless; in them "early or suspected cases" are in reality too advanced for any treatment to arrest the disease.

I am, Sir, yours faithfully,

FRANK E. TYLECOTE, M.D., D.P.H., M.R.C.P.,
Assistant Physician, Manchester Royal Infirmary; Visiting Physician to the South Manchester Union Hospitals and Lunacy Wards; sometime A.M.O. and Pathologist, Winwick Asylum.

Manchester, August 12th, 1919.

To the Editor of THE LANCET.

SIR,—I do not think that Dr. F. A. Elkins and Dr. Hyslop Thomson, in their paper published in THE LANCET of August 9th, lay enough stress on the importance of ventilation in asylums when writing on the incidence of tuberculosis. In my opinion the bed-space requirements of the Board of Control (50 square feet in ordinary wards and 67 in hospital wards) is quite inadequate for an asylum population. It must be borne in mind that even for a large asylum they only recommend an isolation hospital with three beds for each sex, which quite precludes the treatment of colitis, for instance, in such hospital. Some years ago I saw at Shrewsbury Asylum what I thought was an admirable arrangement for ventilation, especially in hot weather. The lower sash of each window was of double length, the lower half being unglazed and being housed below the window-sill when the window was closed; when raised it had the effect of a widely open window, the empty frames fulfilling the purpose of bars without their appearance. I suggested the adoption of this arrangement in a new asylum some years ago, but the Commissioner to whom my suggestion was referred poohpoohed it.

As regards the dietetic requirements, I do not think that any asylum superintendent would deny that the excessive mortality from tuberculosis since 1914 was due to insufficient food, and that it would have been much greater if the requirements of the Board of Control (no doubt under the direction of the Food Controller) had been carried out literally.—I am, Sir, yours faithfully,

H. K. ABBOTT,
Medical Superintendent, Hants County Asylum,
Knowle, Fareham.

August 18th, 1919.

THE RESULTS OF COMPLETE COLECTOMY.

To the Editor of THE LANCET.

SIR,—Under the above heading Mr. J. F. Dobson criticises, I think with justice, the imperfect manner in which Major James Taylor has recorded his series of six total colectomies in THE LANCET of August 2nd. Apparently Major Taylor is a whole-hearted disciple of Sir Arbuthnot Lane, and he carries his intimation so far as to imagine that his readers will be satisfied with the statement that the patients made an excellent recovery from the operation; that he has seen four of his cases recently, of whom three were not troubled with looseness of the bowels.

My own experience of total colectomy is limited to one case, and I freely admit that only a few days ago the patient consulted me on account of disturbed nights owing to looseness of the bowels. The colon in this case was excised for dilatation and recurrent attacks of obstruction. Her symptoms are markedly improved, and her looks are satisfactory, but she is not yet free from intestinal troubles.

It appears to me high time for a clinical demonstration of these cases of complete colectomy, and I hope that steps may be taken in this direction at the Surgical Section of the Royal Society of Medicine. We must be supplied with scientific data on this subject, and the matter should no longer be obscured by such literature as is provided in Sir Arbuthnot Lane's book, entitled "The Operative Treatment of Chronic Intestinal Stasis"; a rather quarrelsome symposium by several authors, abounding both in contradictions and repetitions. This has been adequately reviewed in the April number of the *British Journal of Surgery*, and apparently the art of "slating" is not quite a lost one.

The pity of it is that such a straightforward surgical question should not receive a clear answer. If the whole colon should be removed by all means let us resect it, not because we can, but because we ought.

I am, Sir, yours faithfully,

Devonshire-place, W., August 14th, 1919. JOSEPH E. ADAMS.

A CRITICISM OF THE MEMORANDUM ON MALARIA.

To the Editor of THE LANCET.

SIR,—May I offer one more criticism of the Memorandum on Malaria recently issued by the Ministry of Pensions? The object of such a publication is, I imagine, to give help to the civil practitioner when called upon to diagnose and treat cases of malaria that have been discharged from the Army, but the vague instructions and information that it gives must, I feel sure, mislead rather than guide him.

Description of the Forms of Malaria.

The diagnosis as described is correct, but it deals almost exclusively with the features of what I call a true tropical attack. When demobilised and sent home to England, cases often show symptoms of a far different nature, their condition being post malarial, and post malarial conditions are essentially influenced by climatic and hygienic conditions. The practitioner will, in all probability, be called to treat cases confined largely to the following classes: 1. Those who have already been through a thorough course of hospital treatment following the acute attack—and the vitality of the infecting plasmodium therefore reduced. 2. Those who have already become reacclimatised to home conditions.

Cases such as these will not give symptoms of true tropical attacks. It is the subsequent general constitutional disturbances that will make for difficulty of diagnosis. There will be every kind of obscure symptoms, and men without knowledge of these, whilst looking for the standard symptoms, will probably fail even to recognise them. Therefore the Memorandum should have laid special emphasis on the symptoms and appearances of post tertian and quartan cases, as it is highly improbable that men suffering from the more severe forms would be discharged and sent home.

The Memorandum makes a strong point of "periodic attacks," but this, I think, is misleading; it should only arouse suspicion; it should surely never make diagnosis certain. Many chronic cases never show a typical rigor. Enlargement of the spleen is mentioned as being important; this is correct, but no word is spoken as to the character of enlargement—i.e., the recent case giving "soft" and the long and chronic case giving the "hard" (ague cake)—two conditions requiring entirely different treatment. Pigmentation of various degree, especially around the eye, jaundice, the cold clammy skin with sweating head and tachycardia—these I have seen as giving the only symptoms of undoubted malarial cases. Fine muscular tremors, with anæmia and emaciation, likewise are the only symptoms of another group of cases.

Nervous disorders should have been given a very important place. Peripheral neuritis, muscular and auditory hyper- and an-algesia, vertigo, and impotence should all have been laid stress upon. "Severe symptoms are usually absent," so says the Memorandum, but surely many of the conditions I have mentioned may be most serious, and nephritis, which is often present, especially so.

Under the vague term "malarial cachexia" a countless number of important symptoms are summarily dismissed. Diagnosis by aid of the blood film is good in the hands of an expert, but almost impossible to the practitioner. A great amount of patience and quite a fair amount of experience is necessary, and no mention is made of the very important fact that a blood film taken within 24 hours of a patient being given large doses of quinine is almost valueless. Films taken between attacks often give negative results. The best time to take the blood is about ten hours after the rigor. In brief, instead of diagnosis being a simple thing, as the

Memorandum assumes, except in acute cases, it may be extremely difficult.

Treatment.

I agree with Dr. Gordon Ward that the general and indiscriminate administration of quinine is not sound advice. Quinine is the standby in acute cases—given a few hours before or during sporulation (i.e., the attack) and for some time afterwards—but to give this drug for several months on end to chronic anæmic and emaciated non-febrile cases is folly. A man must "know" quinine and understand malaria. Dr. T. H. Jamieson, in his letter of August 9th, makes the same mistake as the Memorandum. He speaks as if there were but one type of case to consider. The cessation of rigors by the action of quinine does not mean that there has been any cure of malaria. To the civil practitioner this above all things should be pointed out to him—viz., that for any length of time after the attack is cured later symptoms may, and probably will, develop, and that when these later symptoms follow quinine is to be avoided. The administration of a powerful protoplasmic, and therefore metabolic, poison to a person whose natural bodily resistance has already been lowered by the infection, is obviously a practice to be condemned. The danger we have to fight against is not the one Dr. Jamieson suggests—i.e., the failure to give adequate doses of quinine for a sufficiently long period—but the very opposite; the failure to discontinue quinine in cases of malaria showing a post-malarial condition. Dr. Jamieson's statement that such a condition—i.e., "chronic tachycardia and effort syndrome"—"is in most cases the result of inadequate doses of quinine for a short period" shows merely an attempt to substitute fancy for fact. I have suffered myself from the effects of malarial infection for the last ten years—I have undergone thorough hospital treatment with quinine in full doses for some time. I have been cured of the attacks, but no amount of quinine could have prevented my present post-malarial symptoms from developing, and it is because my experience has taught me to avoid quinine now that I am able to enjoy comparatively good health. It is the post-malarial conditions that will be met with mostly in this country, and for these the iron salts with arsenic, colloid preparations of iodides, organotherapy, high frequency, &c., all find their legitimate use.

I have had a varied and extensive practical experience, extending over ten years in the native and European hospitals in Africa (and more recently in the last campaign), and I know that the civil practitioner at home here will, if he adheres to the principles laid down in the Memorandum and Dr. Jamieson's letter, find much to perplex and deceive him.

I am, Sir, yours faithfully,

C. R. CORFIELD, B.Sc., L.M.S S.A.,
Late Superintendent, Govt. Area and Glencairn Hospitals, Transvaal, South Africa.

August 16th, 1919.

To the Editor of THE LANCET.

SIR,—In your issue of August 9th Dr. T. H. Jamieson takes me to task for what he describes as "pernicious and dangerous advice." May I be permitted a few words in reply? Dr. Jamieson seems to assume that I habitually give smaller doses of quinine than he considers correct. As a matter of fact, I give the same doses as he does himself; nor is there anything in my previous letter to suggest that I ever did otherwise. I plead guilty, however, to calling attention to the fact that there is something more than quinine administration to be thought of—i.e., "improvement of the natural resistance of the body." Anyone who was able to judge of the results obtained by hospital and convalescent camp treatment respectively, the quinine dosage being the same, must bear me out in this. I gather that Dr. Jamieson has not had the opportunity of studying this experiment—for as such it may be regarded—which was so successful with the 10th Division on their return from the East to France. This same experiment also goes far to disprove Dr. Jamieson's assertion that effort syndrome is commonly due to insufficient or irregular quinine treatment, inasmuch as the effort syndrome, &c., persisted in hospital but disappeared in convalescent camps.

I stated that the instructions about intramuscular injection in the Memorandum were unwise. I still think so. Dr. Jamieson says that "a very elementary knowledge of anatomy will enable one not to inject in the close proximity of an important nerve trunk." So it will, but this elementary knowledge is not always available, as witness the fact that the official instructions on this matter issued to M.O.'s of the Salonika army were grossly inaccurate as to the position of structures in the buttock.

Dr. Jamieson speaks as if he believed that quinine killed the malaria parasite and that no other treatment was necessary. This view has been widely held, but I recently had the pleasure of hearing Sir Ronald Ross admit publicly that he had grave doubts whether quinine had any direct effect at all on the parasite—a conclusion to which many others have come. In the circumstances blind reliance on quinine ought not to constitute the whole therapy of the disease, as was usually the case in military hospitals.

In conclusion, may I say that the Medical Society of London is holding a discussion on the treatment of malaria on Nov. 24th. I should feel honoured if Dr. Jamieson would be my guest on that occasion, if he has not had an invitation from other sources. He may rest assured that I may be "pernicious," but I am not "dangerous," so that he can accept with safety.

I am, Sir, yours faithfully,

GORDON WARD.

Sevenoaks, Kent, August 18th, 1919.

THE CONDUCT OF LABOUR AND PUERPERAL SEPSIS.

To the Editor of THE LANCET.

SIR,—Dr. J. H. E. Brock, discussing in your columns last week an aspect of puerperal sepsis which has been neglected for some years, would have us believe that "the reason why there is such a large amount of sepsis still rampant in parturition is that the woman begins her labour with the vaginal canal, and sometimes the uterine canal, surgically unclean," and that the sepsis is due to the inoculation, by the examining finger, of the cervix and uterine wall with organisms introduced into the vagina during sexual intercourse. I think it can be shown that Dr. Brock has over-estimated the danger of intercourse during pregnancy, and I should like to suggest one or two points for consideration.

Examining the evidence brought forward:

1. I submit that it is not reasonable to assume that because conjunctivitis is prevalent within the first week of birth, therefore the maternal passages are "practically never sterile." We have still to learn what numbers of the cases of conjunctival inflammation are due to simple, non-infected irritation by the vaginal secretions (? lactic acid), what numbers become infected immediately after birth (there is ample opportunity), and what numbers are infected in the vagina.

2. It is beyond dispute, of course, that every time sexual intercourse takes place the vagina is contaminated by a variety of organisms, but evidence of sepsis of the vagina at term which consists of proof (if proof were needed) that the organisms were introduced into the vagina by intercourse sometime during the pregnancy is not, I think, worth very much. Even if intercourse far on into pregnancy is the rule, there must be a period of one or two months during which there is no fresh infection, and there are at least two factors to be considered—in a question of evidence—during this period: the destruction or neutralisation of the organisms by the mother, and the possibility that the organisms may die or destroy each other from other causes.

3. I cannot understand Dr. Brock's "*very conclusive proof* (my italics) of the capability of the uncleansed, but otherwise healthy, penis of causing puerperal sepsis." I should expect a rise of temperature after intercourse on the seventh night of the puerperium if the penis had been *boiled*.

But let it be granted that the passages at term are practically never sterile; what is the true significance of the organisms present? If a man presents his wife during her pregnancy with virulent germs from a diseased urethra it is one thing, but puerperal fever occurs in women whose genitals, and whose husbands' genitals, are healthy. Is there any evidence to show that in such a case the infection is due to organisms present in the vagina before labour?

On general grounds one would not expect intercourse during pregnancy by healthy people to be dangerous. It is not probable that a man and woman can both harbour in the genital region a germ of great virulence for months without symptoms. It must happen frequently that bacteria are placed during intercourse very near the cervical canal immediately before the onset of the menstrual flow and very soon after the period, almost certainly whilst there are raw areas in the uterus. It is reasonable to suppose that organisms (as well as spermatozoa) enter the uterus, and yet

no harm follows. I suggest that there is some factor (other than fatigue, size of wound, access to open vessels, &c., which, to my mind, do not meet the case) which operates to make a woman particularly susceptible during a particular labour.

Dr. Brock asks what a surgeon would say if he were asked to operate in a region so soiled as the vagina. Probably—"It might have been piles."—I am, Sir, yours faithfully,

Lansdowne-road, S.E., August 19th. R. L. KITCHING, M.B., B S.

Obituary.

WILLIAM SMITH GREENFIELD, M.D. LOND., F.R.C.P. LOND. & EDIN.,

EMERITUS PROFESSOR OF PATHOLOGY AND OF CLINICAL MEDICINE IN THE UNIVERSITY OF EDINBURGH.

William Smith Greenfield was born at Salisbury and received his medical education at University College Hospital, London, graduating M.D. in 1874. In the same year he became demonstrator in morbid anatomy and pathology at St. Thomas's Hospital, where for two years previously he had been registrar. Later he became assistant physician and physician for diseases of the throat at the hospital. In 1878 he succeeded Dr. Burdon Sanderson as professor of pathology at the Brown Institute.

It was at St. Thomas's Hospital that William Greenfield laid the foundation of a great career in pathology, influenced by such leaders of thought as Wilson Fox and Murchison. When in 1881, he came to Edinburgh, he had already made his name as a teacher, a clinician, and a pathologist. Both at St. Thomas's and at the Brown Institute he made full use of all the material at his disposal and devoted himself with great enthusiasm to the study of contagious and infectious disease. His work on anthrax stands out as the record of a great scientific observer, and his original publication on "wool-sorter's disease" is still the classic on the subject. Encouraged and abundantly supplied with means by the French Government, Pasteur carried out a great piece of experimental work, which in 1881 resulted in a communication to the International Medical Congress in London dealing with a successful means of protecting animals against infection with *B. anthracis*. This work is justly recognised as one of the greatest contributions on the subject of vaccination, but it is not generally recognised that priority for the discovery must be given to Greenfield. Working with a small and inadequate sum of money furnished by the generosity of a private society, and hampered by the difficulties interposed by the law dealing with experiments on animals, he obtained the same results working with similar methods. His work was published in the Proceedings of the Royal Society in 1880.

Greenfield's work on the "Pathology of the Kidney," published by the New Sydenham Society, is, one of the most accurate pieces of pathological work on the kidney in the English language. All his other work shows the same accuracy and attention to detail. All pathologists regret that during his later years he did not give to the world of science the results of his wide experience, which would have been invaluable to all working in the same field as himself. Those of us who admire him most are fully conscious of this defect, which was largely due to self-consciousness. He was a critic of all scientific work, but his most severe criticism was reserved for his own and, though much work was got ready for publication, it never satisfied the demands of its author. This hypercriticism may be regarded as a great fault in a teacher, but though he did not publish widely, he gave his rich experience to those who worked under him, and the pathological world has benefited indirectly through the work of Woodhead, Muir, and the other professors of pathology and bacteriology who commenced their careers as Greenfield's assistants. Trained as a clinician and having the only sound basis for clinical medicine, a thorough knowledge of morbid anatomy and histology and experimental pathology, it is not surprising that in his introductory lecture at Edinburgh Greenfield said: "It is *living* matter with which we have to deal, and it is by the exact study of the phenomena of life that we must bridge over the chasm between dead morbid anatomy and living pathology." Or again: "The study of clinical medicine and pathological experiment are, in my opinion, the inseparable adjuncts of pathological study. That would be a strange physiology which should conduct its study on dead animals alone, and no less strange a pathology studied only on dead subjects." Believing this, and striving with all his energy to give the living pathology to his students, one cannot wonder at his success—a success which is not measured, but which is partly shown by the number of his pupils who have held or are holding important posts in pathology and bacteriology in this country and in our Dominions. It may be said that the Pathological School of Edinburgh has in the past directed the pathological teaching of this country, and that largely because Greenfield inspired those who worked under him to search for truth. Never bound by old shibboleths but always sceptical of the new, he taught others to do that which he himself always did—viz., examine all new facts and theories brought forward, try them, and, if the evidence justified them, then have no hesitation in accepting them and making them bases for further work.

One of his best-known lieutenants thus writes about him: "To his assistants he was always ready to give help and advice, and I often marvelled at his knowledge of the literature of his subject. To be an assistant with him was both an honour and a privilege, for it was only those who were intimately associated with him who knew the real man. Sir German Sims Woodhead, in a letter to me the other day, said, 'I always look back to the period of association with Greenfield as a very pleasant and profitable time. I was fond of the man.' That, I am sure, will be the feeling of everyone who has been an assistant with him. We were drawn to him, not by the mere admiration of a student for a great and brilliant chief, nor by the pride of being associated with a really great pathologist, but by a real bond of friendship and love for the man. A severe but just critic, a man who could not tolerate slackness, and one who loathed toadyism in all its forms, it is not to be wondered at that he made enemies. But his enemies were never those who really knew him. To see him in his own home, to know his real interest in his students, and to have evidence, as I abundantly had, of the true greatness of his character, is to make me look back with pleasure to the years I spent with him. He himself has passed, but his memory must always remain to those, who, like myself, have been closely associated with him and who owe so much to him." J. M. B.

LOVELL DRAGE, M.D. OXON.

THE profession has lost a valuable and well-known practitioner by the death, from septic poisoning, of Dr. Lovell Drage, of Hatfield. Born in 1859, he was educated at Winchester, Christ Church, Oxford, Owens College, Manchester, and at St. Bartholomew's Hospital, where he was house surgeon to the late Sir Thomas Smith, and resident midwifery assistant under Dr. J. Matthews Duncan. He took a science degree at Oxford in 1881, and proceeded to M.B., B.Ch. in 1887, and M.D. in 1893. After a distinguished career as a student and member of the junior staff at St. Bartholomew's, he joined his father in practice at Hatfield, Herts, and was for many years well known in the country and in medical circles in London. His tall figure and cheery greetings of numerous old friends were a feature of many meetings, whether social or scientific, in the medical world. In spite of the claims of large and important practice and much public work of an urgent character, Drage found time to pursue original clinical observation. His inquiry into the use of the derivatives of cinnamic acid in malignant disease is a case in point. Various papers on this subject from his pen appeared in the columns of THE LANCET, and though his views got no strong outside support, they obtained the respect earned by his obvious sincerity. A man of clear and decided opinions, he was a generous and straightforward opponent of those with whom he disagreed; but he will be remembered far more widely as a warm-hearted and genial friend.

Drage was a typical country sportsman, and in his earlier years a fine horseman and good shot. He had a faculty for preserving old friendships, many of them begun at school or at St. Bartholomew's Hospital, and a large group of men will regret the genuine and warm hospitality of the old house at Hatfield. He will be widely and acutely missed in his county of Hertfordshire, where among other important public posts he held the office of coroner, and in that capacity conducted the inquest upon the bodies of the crew of the Schutte-Lanz airship which was brought down in flames at Cuffley on Sept. 3rd, 1916. The sympathy of many will go out to his widow, his son, Major R. L. Drage, and his daughter.

Parliamentary Intelligence.

HOUSE OF LORDS.

WEDNESDAY, AUGUST 13TH.

Closing of Dublin Hospitals.

Lord SHANDON asked whether the attention of H.M. Government had been directed to the impending closing of the Houses of Industry Hospitals in Dublin; if it was intended to take any action relating thereto; and moved for papers. He said that he desired, if possible, to draw from the Government some sympathetic view and practical assistance in connexion with the serious difficulty that had arisen with regard to the management of four hospitals, which were essentially State hospitals, and at the present time were supposed to be supported by a grant from Imperial resources. This was really a serious matter which ought to be dealt with, and he hoped to suggest one practical way of dealing with it. In the eighteenth century there were established by the Irish Government of the time a series of hospitals to provide surgical and medical aid for the poorer classes in Dublin and Ireland generally, and these hospitals for a time fulfilled the functions now fulfilled by Poor-law relief hospitals. Under the Act of Union this was one of the liabilities taken over by the Imperial Government, and a short time after the operation of the Act of Union it was found that difficulties, both from a monetary and a practical point of view, arose with regard to these hospitals. Two inquiries were held. One was an inquiry by the House of Commons in 1854 and the second was an inquiry held by a commission, generally referred to as the South Commission, in 1856. The South Commission reported that these hospitals were doing such good work that they should be maintained in their then state of efficiency. The report of the South Commission was followed by an Act of Parliament called the Hospitals Regulation Act, 1856, which constituted the hospitals in their present form. They consisted of a group and were called the Richmond, a surgical hospital; the Whitworth, a medical hospital; the Hardwicke, a purely fever hospital; and the Auxiliary block for surgical and certain emergency services. These four hospitals were constituted under the statute with a government of a very peculiar character. The Lord-Lieutenant of Ireland, through the Irish Office, exercised complete control over the management of these hospitals. The buildings themselves were not private property, but were vested in the Commissioners of Public Works in Ireland, and nothing could be done in that way to mortgage or charge these buildings except with the Commissioners' approval. This showed how completely they were State institutions. But more than that, resulting from the recommendations of the South Commission, a sum of £7600 originally, and now £7500, per annum was provided as being sufficient to keep up these hospitals. From 1856, down to the beginning of the war, this grant was found sufficient—a rather tight fit, perhaps, but still sufficient—to keep them going. It was quite impossible to keep any institution going on the same rate of contribution that was possible before the war. He was informed that while prior to the war £64 12*s.* 11*d.* per patient was sufficient to keep the hospitals going, in 1919 the sum required per patient was £119 1*s.* 10*d.* In Dublin there were a number of hospitals supported by voluntary contributions, most of them being at present in debt. The difficulty of getting the public under present conditions to clear off debt or to keep the hospitals going in their old condition of efficiency was practically insuperable. These particular hospitals had no private subscriptions, and though the statute under which they were constituted did contemplate private subscriptions, the power had never been used, and the hope of getting money in present circumstances from private sources was, he was afraid, an impossibility. The four hospitals together were practically the largest institution of the kind in Ireland. The closing of them would not only affect the indigent poor, but seriously affect medical science and practice in Ireland. It would also seriously affect the training of nurses. The hospitals were practically closed and there was no chance of their being opened unless some practical solution was found. Perhaps a business inquiry representing the Treasury, the medical profession, the governors, and perhaps some of the business men of Dublin, might come to some conclusion. The doctors said, he was informed, that suddenly to shut down one of these hospitals was practically impossible. If they shut down the fever hospital there would be no sufficient accommodation for fever patients in Dublin. If the emergency block were shut down they would have to take serious cases across the city in cars or ambulances, with great suffering to the patients. The doctors said it was practically impossible. Surely some solution might be found before the winter.

The Earl of MAYO supported Lord SHANDON'S motion, and expressed the view that he had made out a strong case for these hospitals, which were much needed in Dublin.

The Earl of CRAWFORD (Chancellor of the Duchy of Lancaster), replying for the Government, said these hospitals were not State hospitals in the sense that they rendered any special service to the State. They differed in no degree from any other hospital in Ireland or in Great Britain, except that they had the good fortune for many years to have received a special grant. From accounts he had before him it would certainly appear that the State subsidy of £7600 was not the only source of income available to this charitable institution.

Lord SHANDON: It is the only one except the private patients.

The Earl of CRAWFORD, continuing, said that during the last two or three years the hospital had had a very considerable income from the War Office apart from the money voted by Parliament. Last year it was £7000; the year before £6300; this was in addition to the income from patients who could afford to pay.

Lord SHANDON: They are not very large, but there are some.

The Earl of CRAWFORD: They are upwards of £3000 a year. He was afraid he could not hold out hopes to the noble and learned Lord that the Treasury would see its way to recommend Parliament to pay a larger sum than the present annual grant. He did not think it would be wise to do so.—The motion was by leave withdrawn.

War Pensions Bill.

Their Lordships went into Committee on the War Pensions (Administrative Provisions) Bill, the Earl of Kintore in the chair. On Clause 8 (dealing with appeals to Pensions Appeal Tribunals),

The Earl of CRAWFORD moved an amendment to provide that no appeal should lie in the case of any claim already heard and rejected by a Ministry Appeal Tribunal. This prevented a man having his case dealt with by a new tribunal after it had already been settled by a competent tribunal in existence.

The amendment was agreed to.

The Committee stage of the Bill was concluded, the Bill was reported and read a third time and passed.

HOUSE OF COMMONS.

WEDNESDAY, AUGUST 13TH.

Medical Breakdown in Afghan Campaign.

Major Earl WINTERTON asked the Secretary of State for India if he would state what steps he was taking to inquire into the allegations regarding transport and medical breakdown in the Indian Army operations against Afghanistan.—Mr. MONTAGU replied: I have caused inquiry to be made on every definite allegation that is brought to my notice and I hope to lay papers on the table very shortly dealing with the medical arrangements in the North-West Frontier campaign.

Lieutenant-Colonel Sir S. HOARE: Will the papers be laid before the rising of the House for the holidays?—Mr. MONTAGU replied: I do not yet know when the House is going to rise, but I want to get out the telegrams that I have received from the Government of India as soon as possible and I hope to have the papers ready at the end of this week.

Small-pox in the Country.

Mr. CLOUGH asked the Minister of Health if he would state how many cases of small-pox there were in this country, and whether any of them had been introduced from outside.—Major ASTOR (Parliamentary Secretary to the Ministry of Health) replied: During the month of July and the first week in August 60 cases of small-pox have come to the knowledge of the Ministry of Health. Of these one group of cases numbering 25 up to August 7th is associated with the return home of a sailor and three groups numbering eight cases in all up to August 7th to soldiers returning home from abroad. There have been three ship-borne cases intercepted by port sanitary authorities from which there has been no spread of infection.

A Pensions Disablement Appeal.

Sir MONTAGUE BARLOW asked the Pensions Minister whether he would have inquiries made into the case of Mr. A. Wakefield, late able-bodied seaman No. 16,273, of H.M.S. *Ruby*, of 15, Enbridge-street, Trafford-road, Salford; whether this man was invalided from the Navy with flat feet caused through wounds in the leg and ankle after 17 years' service, having joined at the age of 15½ years; whether, on discharge, he was awarded a temporary pension; whether he applied to the local War Pensions Committee for reassessment and was examined by the medical referees on April 29th; and whether, in spite of the fact that his recommendations were forwarded to the Ministry of Pensions and a further medical board ordered, the man was still unable to ascertain what pension, if any, has been awarded to him.—Sir J. CRAIG replied: Mr. Wakefield was invalided for injury to his right leg and was in receipt of disablement pension until May 15th, 1919. The disability of flat feet has been found to be neither attributable to nor aggravated by service. He was medically examined on March 6th, 1919, when the disablement arising from the

injury was assessed at nil. He therefore reverted to a pension of 4*s*. 8*d*. a week for life awarded in respect of his service. On an appeal being received from the local War Pensions Committee on his behalf he was further examined on June 3rd, 1919, when the extent of disablement was again assessed at nil. He is therefore ineligible for resumption of his disablement pension, and the fact has now been communicated to him.

THURSDAY, AUGUST 14TH.

The Isolation of Tuberculous Patients.

Mr. GRATTAN DOYLE asked the Minister of Health if he was aware that at the Northern Hospital, Winchmore Hill, London, certain wards were used for consumptive patients in all stages of the disease, the patients including men, women, and children, while other wards were being used for children convalescent from scarlet fever and diphtheria removed from other infectious hospitals; if his attention had been drawn to the fact that the whole of the wards referred to were enclosed in one building, that the nursing staff was presided over by one matron, and that the nurses were employed indiscriminately in either infectious or tuberculosis wards; whether, if he decided that the hospital should still house both classes of patients, steps would be taken to appoint a recognised expert to take responsible charge of the tuberculosis wards; and if he would ascertain if there was sufficient and suitable space for recreation for sanatorium patients.—Major ASTOR replied: Some blocks at the Metropolitan Asylums Board Hospital, Winchmore Hill, are used for the treatment of tuberculous patients and other blocks for convalescent cases of acute infectious disease, but no ward and no block is used for more than one disease. The tuberculous patients are classified in their respective wards according to the stages of the disease. A nurse engaged in nursing tuberculosis is not allowed to come into contact with cases of acute infectious disease. An entirely separate medical staff, with special experience in tuberculosis, under the general supervision of the medical superintendent of the hospital, is in charge of the blocks for the treatment of tuberculosis. Having regard to the class of cases admitted to these blocks the space available for recreation is sufficient and suitable.

Grants to Panel Practitioners.

Mr. GODFREY LOCKER-LAMPSON asked the Minister of Health if he would state what was the cost each year of the grants made and promised to panel doctors and chemists in respect of war bonuses or allowances.—Major ASTOR replied: Grants by way of war bonuses or allowances as distinct from the regular payments for remuneration for insurance practice have been made to insurance practitioners in respect of the year 1918, amounting to approximately £300,000. Approval has been given by the Treasury for the grant of a war bonus to insurance practitioners in respect of the year 1919 on a basis corresponding broadly to that laid down by the Conciliation and Arbitration Board for Civil Servants. The cost of the grants for the year 1919 is estimated to be approximately £950,000. These figures are for Great Britain. As regards chemists, the increase in remuneration afforded them in respect of war conditions forms part of a general charge upon funds provided for defraying the cost of medical benefit, and cannot be readily separated.

Medical Officers obtained by the War Office.

Major FARQUHARSON asked the Secretary for War if he would state the number of new medical officers which had been obtained by the War Office upon the consolidated rates of pay offered at the commencement of July of this year.—Mr. FORSTER (Financial Secretary to the War Office) replied: The number of new medical officers obtained is 27.

Release of Medical Officers in the Army.

Major FARQUHARSON asked the Secretary for War (1) if he was aware that the contract under which a number of medical practitioners held temporary commissions in the Royal Army Medical Corps would expire on the date on which the termination of the war was officially declared; and what arrangements had been made to enable those practitioners now serving in India and Mesopotamia to return to this country immediately on the termination of their contracts; (2) if he would state under what authority medical and other officers were being temporarily retained in India; and what steps were being taken to ensure the immediate release of those medical officers who were marked for early demobilisation by the Ministry of National Service prior to April of this year.

Mr. BENNETT asked the Secretary for War whether, in view of the fact that Royal Army Medical Corps officers in India serving under yearly contracts were to be demobilised previously to those who volunteered for the duration of the war, he would consider the claim to compensation of officers of the latter category whose practices, which they had built up by their exertions and for which they paid substantial sums, had been virtually ruined and absorbed by the large number of medical officers demobilised from France and other theatres of war; and whether he would state how many temporary medical officers, exclusive of sick, had been sent home from India since the armistice and how many remained in India.—Mr. FORSTER replied: Temporary medical officers are being retained in India under the terms of their contracts, which render them liable for service for the duration of the present emergency. The only officers who are serving on yearly contracts are those who are not liable to the Military Service Act, and cannot therefore be retained beyond the termination of their contracts. The contracts of temporary officers serving for the duration of the present emergency terminate on the statutory date for the end of the war, and everything possible will be done to enable them to be returned to the United Kingdom by that date. In the event of this being effected the question of compensation does not arise. One hundred and forty-five temporary, Special Reserve, and Territorial Force officers (exclusive of sick) have been sent home since the armistice, and 335 remain, including 100 officers temporarily detained while en route from Mesopotamia on account of the situation prevailing in India. I would add that every available medical officer who is liable for further service is being placed under orders for India or Egypt in order to relieve those who have been asked for by the Ministry of National Service.

MONDAY, AUGUST 18TH.

Neurasthenia and Shell Shock Treatment in Ireland.

Lieutenant-Colonel WALTER GUINNESS asked the Pensions Minister whether he was now in a position to make a statement on the provision for the accommodation and general treatment of disabled men in the southern region of Ireland who had been discharged suffering from neurasthenia and shell shock; whether accommodation could be found for such invalided men who were on the borderline of lunacy, and who in consequence must be detained, even against their wishes, in institutions; whether he was aware that the authorities of the two institutions in the neighbourhood of Dublin were prohibited from detaining men against their wishes and, therefore, that such institutions were of little value in the case of neurasthenia or shell shock that bordered on lunacy; whether he was aware that in the absence of such accommodation most of the men in question who had no homes were living in lodging-houses, that a few were certified as being potentially dangerous, that the procedure of getting men into an asylum was troublesome and lengthy, and that on more than one occasion before the admission of the man to an asylum had been secured friends interested in his welfare had lost sight of him; whether he considered it satisfactory that ex-Service men should be committed to lunatic asylums in Ireland and treated as paupers in accordance with the Lunacy Laws as they operated in Ireland; whether provision could be made at once to set up a separate institution for the Southern region of Ireland, to which such cases might be admitted and detained for a time even against the wishes of the patient; and whether the scientific treatment accorded to such cases at the Seale Hayne Institution could be introduced into Ireland.—Sir L. WORTHINGTON EVANS replied: I have no power to keep any man in an institution against his will unless he is certified under the Lunacy Laws. A man so certified and sent to an asylum in Ireland has hitherto been treated as an ordinary patient, but under a scheme which will come into force at an early date he will in future be treated as a Service patient. Arrangements are being made to establish a neurological hospital in the South of Ireland for ex-Service men at which scientific treatment for neurasthenia and shell shock will be provided.

Seale Hayne Hospital.

Mr. LAMBERT asked the Secretary for War if he could now state definitely when the Seale Hayne Military Hospital, Newton Abbot, would be evacuated.—Mr. CHURCHILL replied: The work of reinstatement is proceeding as rapidly as is possible, but I am afraid that it is not yet possible to fix a definite date. Three out of the four blocks of the building are empty and are ready for handing over to the owners, who, however, are not prepared to take over portions of the hospital and prefer to wait until the whole can be handed over on the completion of reinstatement. At the present moment the laboratory is being reinstated, and the reinstatement of technical and scientific apparatus is a matter which necessarily takes some time.

Clothes of Asylum Patients.

Sir J. BRUTON asked the Home Secretary whether he was aware that Service or ex-Service men when sent to lunatic asylums were put into pauper clothes until the asylum authorities were notified by the Home Office; that they accepted them as Service patients; and, pending acceptance (which might not be given for six weeks to three months), whether it would be possible to allow these men to wear their Service or civilian clothes, and thus avoid the distress caused to their relatives on finding them in pauper attire.—Mr. SHORTT replied: Ex-Service men sent to lunatic asylums direct from war hospitals under Section 91 of the Army Act or Section 3 of the Naval Enlistment Act, 1884, are immediately transferred to the

private class, and as private patients are allowed to wear their own clothes. This class form the bulk of the ex-Service men admitted to asylums. Ex-Service men admitted on summary reception orders after discharge from the Army or Navy are chargeable to the rates until their eligibility to be classed as "Service" patients has been investigated by the Ministry of Pensions, and they are clothed for the time being as ordinary patients. Where a medical superintendent has reason to believe that a man of the latter class will be accepted as a "Service" patient I think he might properly allow such a patient to wear his own clothing, and I will ask the Board of Control to make this suggestion to the asylum authorities.

Tuberculous Ex-Service Men.

Lieutenant-Colonel RAW asked the Minister of Health if he would state what steps he proposed to take in connexion with the recent report of the inter-departmental committee on tuberculous ex-Service men in view of the urgency of the matter.—Mr. TOWYN JONES replied: The report has been in my right honourable friend's hands for a very short time; and while he quite agrees that the matter is urgent, he is not yet in a position to state what action the Government propose to take.

Medical Inspection of Aliens.

Mr. C. K. MURCHISON asked the Minister of Health if a decision had been reached, in conjunction with the Home Office, concerning the regulations to be carried out in the medical inspection of aliens arriving in this country; and, if so, whether these regulations could now be published.—Mr. TOWYN JONES replied: An Order in Council containing further provisions with regard to the medical inspection of aliens will be issued at an early date. I will see that a copy is sent to my honourable friend when available.

Expenses of Port Sanitary Authorities.

Mr. MURCHISON asked the Minister of Health whether he would consider the desirability of taking steps to secure that the cost incurred by the port sanitary authorities, especially in East Coast ports like Hull and Newcastle, in protecting the people of this country from the inroads of infectious diseases from abroad should be treated as a national charge at least to the extent of 50 per cent. of the amount so incurred.—Mr. TOWYN JONES replied: Yes, sir, this question is already under consideration.

Scottish Board of Health.

Mr. JOSEPH JOHNSTONE asked the Secretary for Scotland whether he was aware that the Minister of Health for England was now in process of forming the consultative councils provided for under the Ministry of Health Act; and whether he proposed similary to appoint the consultative council provided for under the Scottish Board of Health Act.—Mr. PRATT (Parliamentary Secretary to the Scottish Board of Health) replied: The answer to the first part of the question is in the affirmative. The proposals of the Scottish Board of Health for the establishment of consultative councils are being embodied in a draft Order in Council. The actual constitution of the councils must, however, await the fulfilment of the requirements of the Act as to the Order in Council lying before Parliament for 30 days.

TUESDAY, AUGUST 19TH.

V.A.D. Nurses and Gratuity.

Mr. HOGGE asked the Financial Secretary to the War Office whether Voluntary Aid Detachment nursing members who had worked in military hospitals received gratuity; whether Voluntary Aid Detachment general service members working in the same hospitals received no gratuity; whether, if a Voluntary Aid Detachment nurse had served any part of her time as a general service member, she was debarred from gratuity; and whether he could revise these anomalies.—Mr. FORSTER replied: The facts are as stated, except that a nurse is not debarred from gratuity on her service in a non-professional capacity. The nursing members receive gratuity because they are part of the nursing service; the general service members receive, instead, furlough and out-of-work donation on termination on the same lines as members of the Queen Mary's Army Auxiliary Corps. It is not proposed to make any change.

Patients in Military Hospitals.

Major GLYN asked the Secretary for War if any arrangement had been arrived at with the Ministry of Pensions in regard to patients under treatment in military hospitals that were to be taken over by the Ministry of Pensions; and whether the arrangements insured the continuance of treatment by the doctors and nurses who had had previous charge of all non-convalescent cases.—Mr. FORSTER replied: An arrangement has been arrived at. The staff will not be transferred en bloc, as transfer is dependent in part on the wishes of the individuals, but no doubt the Ministry of Pensions will be glad to take into their service as many as possible of the old staffs who are desirous of remaining.

Appointments.

WORSTER-DROUGHT, C., M.B., B.C. Cantab., has been appointed Honorary Neurologist to Out-patients, Bethlem Royal Hospital.

St. Thomas's Hospital: WAYTE, J. W., M.R.C.S., L.R.C.P. Lond., SHOWELL ROGERS, E. N., M.B., B.Ch. Cantab., SMART, A. H. J., M.B., B.Ch. Cantab., BROCKMAN, E. P., M.R.C.S., L.R.C.P. Lond., CARTER, E. E., M.R.C.S., L.R.C.P. Lond., MOOR, F., M.R.C.S., L.R.C.P. Lond., PROCTER, R. A. W., M.R.C.S., L.R.C.P. Lond., Casualty Officers and Resident Anæsthetists; SMITH, J. F., M.R.C.S., L.R.C.P. Lond., AMOS, S. E., ECCLES, C. Y., M.R.C.S., L.R.C.P. Lond., THOMAS, A. E., M.B., B.Ch. Oxon., Resident House Physicians; LE GROS CLARK, W. E., M.R.C.S., L.R.C.P. Lond., SPROTT, N. A., M.B., B.Ch. Oxon., WALKER, J. P. S., M.B., B.Ch. Oxon., HIGGINS, L. G., M.B., B.Ch. Cantab., Resident House Surgeons; RYAN, J. F., M.R.C.S., L.R.C.P. Lond., House Surgeon; POTTER, A. F., M.R.C.S., L.R.C.P. Lond., BIGGER, W. G., D.S.O., M.B., B.Ch. Cantab., Obstetric House Physicians; DICKSON, D. McM., M.R.C.S., L.R.C.P. Lond., EVANS, H. L., M.R.C.S., L.R.C.P. Lond., Ophthalmic House Surgeons; SMITH, F. P., M.R.C.S., L.R.C.P. Lond., Clinical Assistant to the Throat Department; VINEY, A., M.R.C.S., L.R.C.P. Lond., Clinical Assistant to the Children's Medical Department.

Certifying Surgeons under the Factory and Workshop Acts: WILSON, J. C., M.B., B.Ch. Belf. (Ballyward); STEWART, J. K., M.B., Ch.B. Belf. (Randalstown); AITKEN QUINE, W. J., M.B., B.S. Lond. (Chapel en-le-Frith); SELKIRK, A., M.B., C.M. Edin. (Cowdenheath); DONOHOE, D. B., L. & L.M.R.C.P. & R.C.S. Irel. (Rathvilly).

Vacancies.

For further information refer to the advertisement columns.

Adelaide University.—Prof. of Path. and Bact. £800.
Barnsley, Beckett Hospital.—Res. H.S.
Bath Royal United Hospital.—H.P. £150.
Benenden National Sanatorium, Kent.—Asst. Med. Supt. £175.
Birmingham Education Committee.—Asst. Sch. M.O. £300.
Birmingham General Hospital.—Two Asst. S.'s. £90. Also Res. M.O. £155.
Bradford, Odsal Sanatorium for Tuberculosis.—Res. Asst. M.O. £300.
Bradford Royal Infirmary.—Res. Surg. O. £250.
Brighton, Royal Sussex County Hospital.—Asst. H.S. £80.
Bristol Eye Hospital.—H.S. £150.
Buxton, Derbyshire, Devonshire Hospital.—Asst. H.P. £120.
Camberwell Infirmary, Brunswick-square, Camberwell.—Locum Tenens Asst. M.O. £7 7s. weekly.
Carlisle, Cumberland Infirmary.—Res. M.O. £200.
Chichester, Royal West Sussex Hospital.—H.S. £200.
Chorley Education Committee.—Asst. Sch. M.O. £400.
Cornwall Education Committee.—Asst. Sch. M.O. £400.
Derbyshire Royal Infirmary.—Oph. H.S. £200.
Devonport, Royal Albert Hospital.—Res. H.S. £200.
Dumfries and Galloway Royal Infirmary.—Res. Asst. H.S. £75.
East London Hospital for Children and Dispensary for Women, Shadwell, E.—H.S. £125.
Evelina Hospital for Children, Southwark, S.E.—H.S. and H.P. £160.
Finchley Urban District.—M.O.H. and Sch. M.O. £600.
Glamorgan County Asylum, Bridgend.—Fourth Asst. M.O. £400.
Glasgow, Royal Samaritan Hospital for Women.—Asst. Visiting S.'s.
Great Yarmouth Hospital.—H.S. £200.
Greenwich Union Infirmary, Vanbrugh Hill, East Greenwich, S.E.—Deputy Med. Supt. £400.
Gutsborough Union.—M.O. £700.
Hong-Kong University.—Lecturer in Biology. £400.
Isleworth Infirmary.—Sec. Asst. to Med. Supt. £300.
Italian Hospital.—H.S. £150.
Khartoum, Wellcome Tropical Research Laboratories.—Asst. Bacteriologist. £600.
King's Lynn, West Norfolk Hospital.—H.S. £150.
Leeds Public Dispensary, North-street.—Res. M.O. £200.
Leeds Seacroft Hospitals for Infectious Diseases.—Res. M.O. £300.
Leyton U.D.C. Education Committee.—Asst. M.O. £350.
Liverpool, David Lewis Northern Hospital.—Three S.'s and Two P.'s. £150.
Liverpool Royal Infirmary.—Hon. Asst. Gynæcol. S.
Liverpool School of Tropical Medicine.—Tropical Research, Brazil. £300.
London County Council.—Fourth and Fifth Asst. M.O.'s at London County Mental Hospitals. Fourth Assts., £425 to £500; Fifth Assts., £300 to £400.
Maidstone, Kent County Ophthalmic Hospital.—Hon. Oph. S.
Manchester, Ancoats Hospital.—Res. S.O. £200.
Manchester Children's Hospital.—Asst. S. £50.
Manchester, Monsall Fever Hospital.—First Med. Asst. £350. Second Med. Asst. £300.
Manchester Royal Infirmary.—Med. and Surg. Registrars. £75. Surg. Tutor. £30. Also H.S.'s. £25.
Melbourne University.—Lecturer in Pathology. £600.
Middlesbrough, North Ormesby Hospital.—Asst. H.S. £175.
Middlesex County Council.—Female Asst. M.O. £500.
National Hospital for Diseases of the Heart, Westmoreland-street, W.—Res. and Non-Res. M.O.'s. £100 and £50.
Nelson, Lancs.—M.O.H. and Sch. M.O. £700.
Newport Borough Asylum, Caerleon, Mon.—Asst. M.O. £300.
Northampton General Hospital.—Pathologist. £75.
Northamptonshire C.C. Education Committee.—Sch. Dentist. £350.
Oldham County Borough.—Asst. M.O.H. £450.
Preston Royal Infirmary.—Res. H.S.
Prince of Wales's General Hospital, Tottenham.—Hon. Asst. P. and Hon. Asst. Ophth. S. Also Clin. Asst.'s.
Putney Hospital, S.W.—Res. M.O. £150.
Queen's Hospital for Children, Hackney-road, Bethnal Green, E.—H.S. and Cas. H.S. £100 each.

Rochdale Infirmary and Dispensary.—Sen. H.S. £200. Also Jun. H.S. £100.
Roll of Honour Hospital for Children, 688, Harrow-road, W. 10.—Clin. Assts.
Rotherham Hospital.—Senior H.S. £250.
St. Helens Education Committee.—Whole-time Dentist. £450.
Sheffield City Education Committee.—Sch. Dental S.'s. £350.
Sheffield Royal Infirmary.—H.S. for Ear, Nose, and Throat. £150.
Shetland—Tingwall, Whiteness, and Weisdale.—M.O. and Pub. Vac. £45.
South Africa, Mental Hospital Service.—Asst. P.'s. £380.
South Shields, Ingham Infirmary and South Shields and Westoe Dispensary.—Junior H.S. £175.
Southampton, Free Eye Hospital.—H.S. £150 to £200.
Swansea General and Eye Hospital.—Res. M.O. £250.
Taunton and Somerset Hospital.—Res. Asst. H.S.
Warwickshire County Council.—Female Asst. M.O.H. £400.
Westminster Hospital, Broad Sanctuary, S.W.—H.P.
Winsley Sanatorium, near Bath.—Asst. Res. M.O. £250.

The Chief Inspector of Factories, Home Office, S.W., gives notice of vacancies for Certifying Surgeons under the Factory and Workshop Acts at Wadebridge, Port Glasgow, Paisley, and Dundrum.

Births, Marriages, and Deaths.

BIRTHS.

GARDNER.—On August 15th, at Merton-street, Oxford, the wife of A. Duncan Gardner, M.D., F.R.C.S., of a son.
KEYNES.—On August 14th, at Grove House, Hollywood-road, S.W., the wife of Geoffrey Keynes, M.D., of a son.
TATHAM.—On August 10th, at Ealing, the wife of Captain G. T. P. Tatham, R.A.M.C., of a daughter.
WELLS.—On August 17th, at Birchwood, Fleet, Hants, the wife of Major A. G. Wells, D.S.O., R.A.M.C., of a son.

MARRIAGES.

HEBERT—TATTON.—On August 12th, at St. Andrew's Church, Holborn, Godfrey Taunton Hebert, M.D., to Constance, youngest daughter of the Rev. D. and Mrs. Tatton, of Moorlands, Edgware.

DEATHS.

DRAGE.—On August 14th, at North Place, Hatfield, Lovell Drage, M.D.
GREENFIELD.—On August 12th, at Muir House, Juniper Green, William Smith Greenfield, M.D., LL.D., Emeritus Professor of Pathology in the University of Edinburgh.

N.B.—A fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Medical Diary for the ensuing Week.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

LONDON HOSPITAL MEDICAL COLLEGE, in the Clinical Theatre of the Hospital.

A Special Course of Instruction in the Surgical Dyspepsias will be given by Mr. A. J. Walton:—
MONDAY, August 25th.—4.30 P.M., Lecture VII.:—Gastric Ulcer. Complications. Treatment.
FRIDAY.—4.30 P.M., Lecture VIII.:—Surgical Anatomy of the Duodenum and Pancreas. (In the Dissecting Room.)

A Course of Clinical Lectures for Advanced Students on Intermittent Blood Infections and their Relation to Certain Common Diseases of the Kidney, Prostate, Testicle, and other Organs will be delivered by Mr. F. Kidd:—
WEDNESDAY.—4.15 P.M., Lecture IV.:—Etiology and Pathology of Intermittent Blood Infections and their Relation to General Medicine. Intermittent Blood Infection as a Common Factor in the Causation of Disease. The Importance of this Conception for the Future of Preventive Medicine.

Communications, Letters, &c., to the Editor have been received from—

A.—Dr. H. K. Abbott, Knowle; Dr. R. W. Allen, Lond.; Dr. F. L. Apperly, Lond.
B.—British Colloids, Ltd., Lond.; Dr. J. M. Beattie, Liverpool; Dr. E. A. Barton, Lond.; Dr. E. C. Bousfield, Lond.; Dr. S. G. Billington, Wolverhampton; Mr. H. Birrell, Ealing.
C.—Miss H. Chick, Lond.; Mrs. E. J. Coles, Eynsham; Dr. C. R. Corfield, Manchester; Caxton Press, Lond.
D.—Demobilised Medico; Decimal Association, Lond.; Major A. Drury, R.A.M.C.
E.—Dr. R. Eager, Exminster; Surg.-Gen. Sir G. Evatt.
F.—Dr. F. E. Fremantle, Hatfield.
G.—Capt. T. P. Greenwood, R.A.M.C.; Mr. P. Geddes, Lond.
H.—Capt. H. A. Haig, R.A.M.C.; Dr. R. C. Holt, Didsbury; Messrs. W. Heffer and Sons, Cambridge.
J.—Dr. D. W. C. Jones, Lond.
K.—Mr. R. L. Kitching, Lond.
L.—Mr. H. Lucas, Wigan; Dr. C. E. Lakin, Lond.; Rt. Hon. Lord Mayor of Lond.
M.—Ministry of Health, Lond.; Dr. J. McIntosh, Lond.; Dr. I. Moore, Lond.; Mr. A. Miller, Dublin; Dr. A. Maude, Hatfield; Mr. D. M. Macleod, Evesham.
O.—Dr. S. Otabe, Lond.
P.—Messrs. G. P. Putnam's Sons, Lond.
R.—Dr. J. D. Rolleston, Lond.; Royal Medical Benevolent Fund, Lond., Sec. of
S.—Dr. W. J. Shaw, Donington; Secretary of State for the Home Department, Lond.; Mr. B. Sutton, Lond.; St. Thomas's Hospital Medical School, Lond., Sec. of; Dr. J. A. Shaw-Mackenzie, Balblair.
T.—Dr. H. A. Thompson, Lond.; Dr. F. E. Tylecote, Manchester; Mrs. J. F. Todd, Lond.; Dr. A. T. Todd, O.B.E., Huddersfield.
V.—Dr. F. Vicars
W.—Mr. E. M. Wood, Lond.; Dr. G. Ward, Sevenoaks; Dr. L. A. Weatherly, Bournemouth; Capt. A. C. Wilson.

Communications relating to editorial business should be addressed exclusively to the Editor of THE LANCET, 423, Strand, London, W.C. 2.

Notes, Short Comments, and Answers to Correspondents.

STAMMERING AND VOICE DEFECTS.

BY MABEL V. O. OSWALD,
SPEECH SPECIALIST; LATE 1ST SOUTHERN GENERAL HOSPITAL, NEUROLOGICAL SECTION, BIRMINGHAM.

With a Preliminary Note by Dr. J. N. ROBINS.

Dr. J. N. ROBINS, lately in charge of the Neurological Section at the 1st Southern General Hospital, writes as follows:—

"The paper on Stammering and Voice Defects, written by Miss Oswald, will be appreciated by the members of the medical profession as it illustrates in a simple and comprehensive manner a line of treatment which was found to yield highly satisfactory results. Miss Oswald's assistance in the treatment of functional voice defects was of much value, alike to her patients and to me as officer in charge of the Monyhull Neurological Section of the 1st Southern General Hospital. There appear to be two schools of thought on the treatment of stammering: (1) deals with the psychic cause and leaves the symptoms (stammering, aphonia, &c.) alone; and (2) deals with the symptoms (stammering, &c.), and leaves the psychic cause alone. Both of these appear to me to be wrong, for in the first case Scylla is avoided but the danger of Charybdis remains, and in the second case the reverse happens. Therefore, let us take a middle path and deal by mental exploration with the underlying unrecognised cause, and also the symptom by re-education; in this way really good results may be achieved."

Experimental Treatment.

Stammering and functional voice defects have until recently been looked upon as unfortunate disabilities, and no real scientific attempt was made thoroughly to deal with such cases, and hence there was no recognised cure. Various treatments have been in vogue, each one more or less experimental.

The more successful regarded stammering as the result of some purely physical cause—i.e., incorrect respiration, spasmodic contractions of the laryngeal muscles, incoordinated movements of the organs of articulation, &c. Hence the treatment was directed to the correction of these physical disabilities exclusively. In many cases the actual speech defect was overcome, but as a rule the treatment was a prolonged one and the cure by no means permanent, the speech defect (in varying degree) tending to reappear.

Tricks Designed to Overcome Speech Defects.

In some cases the patient was taught to resort to tricks in order to overcome his difficulty—e.g., when commencing to speak: (1) to pitch his voice on a note higher or lower than his natural-speaking voice; (2) to resort to certain rhythmical gestures to induce smooth speech; (3) to "sing" his words; (4) to press his knee firmly with the right hand; (5) or even to hold a pebble in his mouth!

Such methods of treatment obviously could not cure, and have done much harm in making the general public distrustful as to the possibility of a genuine cure. That such means were attended by any fleeting success is probably due to the fact that the patient's attention for the time being was diverted from his speech anxiety to the very unusual method of cure, the later being far more inconvenient, as a rule, than the orginal disability.

Stammering Dependent on a Psychic Cause.

The frequent occurrence of stammering, mutism, and aphonia during the war, in patients with no such pre-war history, has opened a field of inquiry which has had considerable attention paid to it by those medical officers who have been trained in psycho-therapy. It has now been established that stammering is dependent on a psychic cause, with which it is necessary to deal adequately. Hence the original cause of the speech defect is psychical, the stammer being the expression of a memory of some painful nature which is either wholly or partially repressed.

The presence of a stammer, however, gives rise to the feeling of "fear of speech," and the patient loses confidence in his ability to speak before others. He then tries to force himself to speak naturally, but this, as a rule, only results in incorrect respiration, spasmodic contraction of the laryngeal and other muscles, and incoördinated movements of the organs of speech. By degrees these uncontrolled movements, incorrect breathing, &c., become established, which in turn cause the speech defect to become more fixed. This, then, is a secondary and not the original cause of the speech defect.

From regarding stammering as a purely physical defect, to be remedied solely by treating the physical symptom, at the present time there may be a danger of going to the opposite extreme and looking upon it as a symptom which will automatically disappear when the underlying psychical cause has been discovered and fully explained to the patient.

In cases of mutism and aphonia, however, the symptom does tend to disappear automatically. The underlying psychic cause is discovered and brought into consciousness, and by means of strong suggestion the patient is induced to use his voice, which invariably he is able to do. At this juncture, in order to avoid any resultant stammer, care must be taken that the patient produces his voice correctly and has been convinced of his ability to continue speech. This is important, as so many cases of mutism and aphonia became stammerers—i.e., their voice returns, but "anxiety" as to their ability to continue producing it results in a stammer. Convince the patient, and the anxiety disappears and there is no resultant stammer.

Cases Successfully Treated.

One case of aphonia—the result of gassing and being buried by shell—had persisted for nine months in spite of various treatments (massage, electrical treatment, &c.) tried previously in other hospitals. I treated the patient on the lines indicated above, and he was cured in two treatments (of about half an hour each) with no resultant stammer.

In another case the patient lost his voice gradually and the aphonic condition had persisted for nine months. I treated him similarly and he was cured in two treatments with no resultant stammer.

Another case I treated had already lost his voice twice as a result of gassing; the first time (4/8/16), he recovered his voice after three weeks in hospital; the second time (18/9/18) he was gassed again and aphonia had persisted for two months, when he was sent to me. He also was cured with no resultant stammer; and similarly other cases.

But in my experience with cases of stammering—especially those of long standing—the removal of the psychic cause does not necessarily mean that the symptom (stammering) disappears automatically. Logically, this should be so, since stammering (like tremors, monoplegias, &c.) is the outward expression of the patient's subconscious mental state. In practice, however, the stammer tends to remain even though the repressed memories have been brought to the surface and rendered ineffective. This is probably explained by the fact that an incorrect habit of breathing and speech production has been acquired, which the patient must voluntarily overcome.

"Mental Exploration" and "Speech Relief."

In the stammering cases I have treated the quickest results have been obtained where the patient has been treated both physically and psychically—i.e., by giving him certain respiratory and voice exercises together with strong suggestion, at the same time the psychic cause being removed by means of "mental exploration,"—and this latter can only be successfully accomplished by those with knowledge of psychological medicine. In order to effect a cure, therefore, it is obviously necessary to discover the original psychic cause of the stammer.

Hence the method of procedure would be, first, to explain fully to the patient why he stammers; next, and especially in cases of severe stammer, to give the patient "speech relief" by showing him how to breathe correctly, relax his muscles, &c., at the same time using strong suggestion that he will be able to read or say a certain thing correctly and not permitting him to fail. The patient having obtained an initial success must be convinced that he is able to repeat it, and so led to perceive that the cure in reality depends upon himself. By these means of re-education the patient will have gained confidence and lost to some extent "the fear of his own speech," but a permanent cure will not be effected till the psychic cause has been explored.

Examples of Treatment.

The following are a few practical examples of the above method of treatment. In each case the psychic cause was being specially dealt with by neurological medical officers:—

I had a patient with a very severe stammer dating from September, 1918, when he had been blown up by a shell and left dazed. He was being treated by one of the neurological medical officers who sent him to me for his stammer. I gave him certain breathing and voice exercises, which enabled him at once to speak with less difficulty. By means of strong suggestion he was able to read aloud without stammering. I explained things to him and convinced him that, having done so once, he could repeat it, and that the cure now depended on himself. He determined he could and would be successful. I saw him once again (making two treatments in all), when he was able to read aloud and speak with no difficulty and continued to do so.

Another patient had a nervous hesitating stammer when I saw him. He had been blown up and four months later had lost his voice. Aphonia had persisted for seven months, when his voice returned under treatment, leaving, however, this stammer. He was sent to me for treatment. In this case I chiefly used strong suggestion to convince him of his ability to speak with no stammer. He was cured in two treatments.

Another patient with a stammer of three months' duration—after aphonia of eight months—was convinced that he could not be cured. He stammered badly while reading and speaking. I explained things to him and gave him certain breathing and voice exercises, showing him how to control his breath while reading. I then made him read aloud which, after a few attempts, he did with no stammer. When I saw him the second time, he said the stammer now only affected him if nervous. I again explained the nature of his stammer and by strong suggestion convinced him he could overcome it. After four treatments he could read and speak fluently on all occasions.

Pre-War Stammerers.

Similar treatment will be found to apply to pre-war stammerers. In these cases the habit of incorrect speech production is more strongly fixed and, therefore, will take rather longer to remove, but the permanency of the cure will depend (as in cases of war neuroses) on the removal of the psychic cause which originated the stammer.

One patient I treated, who had stammered very severely since experiencing a bad fright in early manhood (in civil life). He joined up and out of two years' foreign service had spent 11½ months off and on in hospital. While recounting the bad fright experienced years ago, the stammer became extremely severe, at times totally inhibiting speech, accompanied by tremors, &c. His respiration was incorrect, with spasms of the diaphragm. I explained to him why he stammered, and gave him special breathing and voice exercises, showing him how to relax his muscles. I then made him read aloud, which he did fairly. At subsequent interviews the stammer and tremors were much less marked, till the patient was able to talk over his experience with absolute calm and no attendant stammer. He had eight treatments altogether, after which he could speak and read aloud fluently on all occasions.

Another patient had stammered slightly since six years of age, the stammer increasing after experiencing air-raids. When I saw him the stammer was very severe, his breathing incorrect and uncontrolled, accompanied by strong muscular contraction of the laryngeal and other muscles during speech. I explained his stammer to him, showed him how to breathe diaphragmatically and to relax his muscles, and in ten treatments he was speaking and reading aloud with no stammer.

Stammering in Young Children.

In cases of purely imitative stammer in young children who are treated immediately, breathing and voice exercises with strong suggestion are sufficient to effect a rapid and permanent cure, probing into their subconsciousness being unnecessary.

A boy of 7, whom I treated, had a severe stammer. He was highly excitable, with little self-control. Though well-built, he had very poor respiratory expansion. By teaching him correct diaphragmatic breathing, giving him easy voice exercises, explaining his "fear of speech," using strong suggestion to give him confidence, and training him in self-control, he was soon absolutely cured. I had him under my direct observation all the time, this being advisable in young children, but not necessary, if older, where the patient will carry out instructions.

I would lay stress on the importance of at once treating a stammer in young children, since, if taken at an early stage, the cure is certain. Most of the adult stammerers in civil life might have been cured when young. Thus it seems apparent, in the case of adults, that to treat the symptom alone, ignoring the repressed memory or, conversely, to revive the repressed memory ignoring the symptom is, in either case, insufficient. The quickest and most permanent results being obtained by a combination of the two—i.e., "mental exploration" and re-education.

WELFARE OF THE BLIND.

THE Ministry of Health announce that they have, after consultation with the Advisory Committee on the Welfare of the Blind, issued Regulations under which, subject to the consent of Parliament, grants will be paid in aid of certain services carried on on behalf of the blind. These services include workshops, assistance to home-workers, home teaching, homes and hostels, book production, &c. In a covering letter to the regulations the needs of the unemployable blind living in their own homes are recognised as requiring legislative treatment, and it is indicated that proposals will be laid before Parliament as early as possible. The regulations have been put on sale (price 3*d*.) and can be obtained directly from the Stationery Office or through any bookseller.

VIVISECTION EXPERIMENTS.

A RETURN issued by the Home Office shows the number of experiments on living animals during 1918 in the United Kingdom. In England and Scotland licences were held by 701 persons, of whom 401 performed no experiments. In Ireland there were 22 licensees, of whom 6 performed no experiments. In England and Scotland the total number of experiments was 77,610; under Group A 1557, and under Group B 76,053. In Group A anæsthesia was required—951 all the time and 606 part of the time. In Group B no anæsthetic was required. They were simple inoculations, hypodermic injections, feeding, and similar proceedings. Cancer investigation accounted for 137 in Group A and 5890 in Group B; 29,000 were on behalf of Government Departments and public health authorities, and over 37,000 for the preparation, standardising, and testing of sera, vaccines, and drugs. In Ireland 313 experiments were performed by 16 licensees, of which 232 were simple inoculations.